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PROCEEDINGS

OF THE

ESSEX INSTITUTE.

VOLUME III.

1860 to 1863.

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PROCEEDINGS

OF THE

ESSEX INSTITUTE.

Wednesday, May 9, 1860.

Annual Meeting this day at 3 o'clock, P.M., Vice President Rev. J. L. Russell in the chair.

Records of preceding annual meeting were read.

Donations, since the meeting of the 26th ult. were announced:

To the Library—from Thomas Pinnock; Jonathan Perley Jr.; Philadelphia Academy of Natural Science; Charles B. Richardson of New York; Theron Metcalf of Boston; James M. Caller; Joseph Winn; Hickling, Swan & Brewer of Boston; N. J. Lord; William Mack; Mrs. O. Parsons; Ezekiel Roberts; Mrs. J. F. Andrew; J. L. Sibley of Cambridge; Essex Agricultural Society; Charles W. Upham; Henry Wheatland.

To the Cabinets—from R. H. Wheatland; C. H. Norris; Emery S. Johnson; Mrs. J. F. Andrew; Joshua Cleaves; Jason Wilkins.

Letters were received from Alpheus Crosby, Cor. Sec'y of

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Essex County Teachers' Association; Trustees of Public Library of Boston; E. Emmerton; A. W. Dodge, Sec'y of Essex Agricultural Society.

The Report of the Secretary was read and accepted.

The Report of the Treasurer was read and referred to the Finance Committee.

The Reports of the several Curators were read and accepted.

These Reports present a careful review of the doings of the Institute during the year. Though no striking event has occurred, yet the increase of the Library, the addition of specimens to the Cabinets and the general interest of the public to promote the objects of our organization, indicate a gradual and healthy growth.

A brief synopsis is herewith appended.

Since the last annual gathering nine of our members have deceased—a larger number has occurred than that of any previous year; no distinction has been made in respect to age—the young just entering upon the active duties of life, those in middle age, and those who, after many years of usefulness, have at length been gathered to their fathers.

1st—Rev. Gardner Braman Perry, D.D., the venerable pastor of Groveland. He was one of the first Vice Presidents of the Essex County Natural History Society, and, in the early organization of the Society, took a lively and deep interest in its success. It was, at that time, a day of small things, and he labored much to excite an interest in the study of the natural sciences and its kindred pursuits, agriculture and horticulture. All institutions, promotive of these objects, received always his cordial aid and support.

He was born at Norton in this State, 9th August, 1783, and

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was the son of Nathan and Phebe (Braman) Perry. In 1800 he became a member of Brown University; at the end of the second year went to Union College, where he graduated in 1804, and where he received the degree of D.D. in 1843. After teaching for some years, he was invited to settle over the church in East Bradford, now Groveland, and was ordained 28th Sept. 1814, and continued his pastoral relation to the church until his decease, which took place on the 2d of December, 1859. He married 1stly, 22d May, 1816, Maria P. Chamberlain of Exeter N.H., 2dly Eunice Tuttle of Acton, July 20, 1819, 3dly Sarah Brown of Grafton, who survives him.

2. Rev. David Tenney Kimball of Ipswich, who delivered a discourse occasioned by the death of Mr. Perry in Groveland on the 25th Dec. 1859, and who speaks well of him in his various relations as a Christian Minister, pastor, friend, &c.; was within a few weeks afterwards called to render the final account of his stewardship, having served in the ministry of the church in Ipswich for more than half a century. His connexion with the Institute was that of an honorary member, in virtue of his relation to the Essex Historical Society. He was born at Bradford, Mass., Nov. 23, 1782, and was the son of Daniel and Elizabeth (Tenney) Kimball of that place. At the age of seventeen he entered Harvard College and graduated in 1803. He was ordained at Ipswich 8th October 1806, and continued his relation to that church and society until his decease, which took place on Friday, 3d Feb. 1860, laboring with great diligence and faithfulness. He was a man of great modesty and humility and one whose memory will long be cherished with affection and respect. He married, Oct. 20, 1807 Dolly Varnum Coburn, daughter of Capt. Peter and Elizabeth Coburn, of Dracut, Mass. She survives him.

3. John Gillison Waters, son of Robert and Lydia Waters, was born in Salem, 11th April, 1796. For many

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years he was in the Zanzibar trade, and was one of the first to engage in it after it had been thrown open by treaty with the Sultan of Muscat, under the direction of President Jackson. He retired in 1842, and has since resided in Salem. He was, at an early age, interested in the religious movements of the times and was a "lover of good men," always ready to assist in undertakings of this character with a liberal and free hand.

4. Miss Elizabeth Amory; daughter of Jonathan and Mehitable Amory, of Boston. For several years she has resided in Salem and taken a great interest in the doings of the Institute. She died at Salem, 6th July 1859, aged 53.

5. Jonathan Lovett Whipple; son of Jonathan and Mary (Cloutman) Whipple, was born at Salem April 19, 1824. He was educated at our schools and early indicated a great taste for mechanical pursuits. For several years past he has been engaged in the cleansing of Gum Copal, in connection with his brothers. He was a man of integrity, firm in purpose, warm-hearted and zealous in every good work, and highly esteemed among his associates for his amiability and gentleness of manners. He died on the 4th of the present month, (May 1860.) He married September 18, 1855, Emma Noyes Dodge.

6. Charles Wentworth Upham, Jr., eldest son of Hon. Charles W. and Sarah (Holmes) Upham, was born at Salem 29th August, 1830. After passing through our several schools he entered Harvard College and graduated in 1852. He pursued the usual course at the Law School in Cambridge; and spent the years 1855 and 1856 in travelling in Europe. For the last two or three years he has resided in Buffalo, N. Y., engaged in the practice of his profession, where he was highly esteemed and gained the respect and love of many friends by his pleasing manners, bright and cheerful temperament and sprightly conversational powers.

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To the graceful qualities of mind were added an accuracy and promptitude for business which could not fail to have met with success.

7. GEORGE FRANKLIN DODGE; son of George and Orrana (Hale) Dodge, was born in Salem, 9th May 1829, and died in the place of his birth, 16th March 1850. He was educated in the public schools of this city, commenced life as a clerk, and step by step was advanced to posts of responsibility and trust; in all of which he possessed the unlimited confidence and respect of his employers. His modesty and retiring disposition prevented him from being widely known, but those who had the pleasure of his friendship will duly appreciate his conscientiousness, integrity, obliging disposition, and gentle and refined manners.

8. GEORGE WASHINGTON RIDER; son of Joseph and Abigail (Janes) Rider, was born at Salem, 6th March 1838. A graduate of the English High School, a good scholar and gave promise of usefulness in life. He died 24th December 1859.

9. JOSEPH ALONZO POTTER, son of Joseph and Sarah (Crowninshield) Potter, was born at Salem, 29th Dec. 1837, and died July 30, 1859. He was an invalid from early youth, and consequently did not engage much in the active duties of boyhood, but was induced to lead the life of a retired student. In 1856 he first played a game of chess, the study of which became his delight and hobby. In January, 1857, he received the Chess Monthly, when he dates his chess life; and from that time to his death he was absorbed in its history and science, whenever health would permit. He composed problems, corresponded extensively with chess scholars—edited for eight months a chess column in the American Union, and during his chess life wrote or received over 1000 letters on the subject and left over 100 original chess problems.

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Five numbers of the Historical Collections were issued during the year 1859, and two numbers of the volume for 1860. They have been favorably received and the success thus far warrants a continuance.

Six Field Meetings have been held, viz: at Wenham, Middleton, Saugus, North Andover, Groveland, and Beverly. They were well attended and awakened considerable interest in the places visited;—also eight evening meetings during the months of December, January, February, March and April;—the quarterly, and ordinary meetings occasionally, for the transaction of the current business.

The following additions during the year may be specified.

To the Library. Many of the additions are valuable, and, with few exceptions, donations from the General and State Governments, societies or individuals.

The additions from all sources are as follows:—

Folios, - - - - - -		6
Quartos, - - - - -		21
Newspapers bound, - - -		46
Octavos or lesser-fold - - -		395
		468
Serials, - - -	1500	
Pamphlets, - - -	1080	2580
		3048

Also, several piles of newspapers more or less perfect.

The above have been contributed by one hundred and fifty-six individuals, societies, &c.

To the Department of Natural History. *Mammals.* Valuable additions, during the year, have been received. The contributions of Dr. H. Neisler of Georgia, consisted

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of a goodly collection of the small quadrupeds of Georgia—and that of James Bartlett of Wenham, those in this vicinity. W. A. Lander presented a specimen of *Otisorex platyrhinus*, one of the smallest of our quadrupeds, and seldom noticed.

Ornithology. Twenty contributors have made large additions. Progress has been made in the arrangement of the collection; the specimens are in good condition. The attention of the members and friends is called to that of the nest and eggs—being deficient in several of the common species.

Herpetology. The curator reports a very gratifying increase from thirty-six contributors, and that the collection in regard to preservation is in the best possible condition; many of the wants in the species of the county have been, through the kindness of friends, supplied, though we are far from having all that is required to give us a complete history of the reptiles of the county.

Ichthyology. The additions have been unprecedentedly large and valuable; the collection of American fishes having been largely augmented by donations and exchanges, while by means of the cans despatched to different foreign countries through the kindness of our merchants and ship-owners, the Foreign specimens have nearly doubled. We are greatly indebted to those gentlemen who have kindly consented to take or send them and hope during the year to obtain still other opportunities. The specimens have all been alcoholic with the exception of a sturgeon, *Acipenser oxyrinchus*, weighing about 150 pounds, presented by C. K. Stevens of Lawrence. The number of donors, thirty-one.

Articulates and Radiates. Thirty-six contributors have made valuable additions—these are principally, however, confined to the crustacea and the radiata—this is owing, in a great measure, to the system of sending cans and alcohol through the kindness of our merchants and seamen. The collection is reported to be in good condition.

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Mollusca. The principal contribution was from S. H. Phillips, who presented a very extensive and valuable collection of shells; they occupy several drawers in the cabinet awaiting for more extensive accommodations for a suitable arrangement.

Comparative Anatomy. Contributors; G. Upton, J. B. King, S. Carlen, &c. Skeletons of several species of toads and frogs, have been placed in the cabinets.

Mineralogy and Geology. Donors; Edwin Upton, E. A. Upton, B. E. Shaw, Miss Emily Gardner, B. W. Stone, G. Upton, W. Briggs, B. F. Mudge, C. F. Williams, O. C. Marsh, W. Prescott.

THE HISTORICAL DEPARTMENT. The curators, in their report, congratulates the society on the increased interest and on the additions during the past year. Articles of every description, tending to illustrate the dress, customs, habits, manner of living &c., of the different parts of the world—particularly of both the East and West Coasts of Africa, India, China, the Sandwich and Fejee Islands, have been received from thirty-nine contributors. This collection Mr. H. F. Shepard is now arranging in systematic manner in groups according to their country, and as far as possible in separate cases,—a catalogue of this department is nearly completed.

DEPARTMENT OF HORTICULTURE. The Annual Exhibition of Fruits and Flowers took place on Wednesday, Thursday and Friday, September 18, 19, and 20, 1849. The weather was very unpropitious—rainy and cloudy during nearly the whole time of the continuance of the Show. Owing to previous storms our gardens were much injured, fruit blown from the trees, &c. However, under these discouraging circumstances the exhibition was much more satisfactory than was anticipated, and it was truly gratifying to witness the general interest in the culture of fruits.

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The following officers were elected for the year ensuing, and until others shall be chosen in their stead, viz:

President—DANIEL A. WHITE.

Vice Presidents—John L. Russell, James Upton, H. M. Brooks.

Secretary and Treasurer—Henry Wheatland.

Librarian—John H. Stone.

Cabinet Keeper—Richard H. Wheatland.

Finance Committee—John C. Lee, R. S. Rogers, George D. Phippen, Henry M. Brooks, James Chamberlain.

Publication Committee—John L. Russell, Henry Wheatland, George D. Phippen, Ira J. Patch, John H. Stone, George M. Whipple.

Library Committee—Daniel A. White, David Roberts, S. P. Fowler.

Curators of Natural History—In Botany—John L. Russell; Mammalogy—F. Winsor; Ornithology—F. W. Putnam; Herpetology and Ichthyology—R. H. Wheatland; Articulata and Radiata—C. Cooke; Mollusca and Paleontology—H. F. King; Comparative Anatomy—Henry Wheatland; Geology—H. F. Shepard; Mineralogy—D. M. Balch.

Curators of History—Ethnology—Wm. S. Messervy, M. A. Stickney, F. H. Lee; Manuscripts—Henry M. Brooks, Ira J. Patch, L. R. Stone, G. L. Streeter, S. B. Buttrick; Fine Arts—F. Peabody, J. G. Waters.

Curators of Horticulture—Fruits and Vegetables—James Upton, John M. Ives, J. F. Allen, R. S. Rogers, George B. Loring, C. F. Putnam; Flowers—F. Putnam, W. Mack, C. H. Norris; Gardens—J. L. Russell, J. S. Cabot, J. Bertram, B. A. West.

A Committee was appointed, consisting of Messrs. C. M. Tracy of Lynn, S. P. Fowler of Danvers, John M. Ives of

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Salem, Benj. C. Putnam of Wenham, R. H. Wheatland and C. H. Norris of Salem, and A. W. Dodge of Hamilton, to arrange for the Field Meetings the coming season.

A Committee was also appointed to arrange for Lectures the ensuing winter, if expedient, also for the Evening Meetings. Messrs. J. L. Russell, James Kimball, F. Peabody, G. D. Phippen, and C. M. Tracy were appointed on said Committee.

The consideration of the report of the Committee on the authenticity of the tradition, "that the old building on the estate of David Nichols, rear of Boston street, was built from the frame of the first church ever erected in Salem", presented at the meeting of the 26th ult., was resumed and after some discussion, the following vote was adopted.

Voted,—That the Committee, who have had charge of this matter, and who have so faithfully and carefully examined all the points of interest bearing on this subject, and have prepared this able and interesting report, be further instructed to take such action in relation thereto as they may deem advisable;—*Provided*, that the funds for this purpose be obtained by private subscription, or by such appropriation from the general income of the Institute, as the Finance Committee may direct.

Voted to adjourn.

Friday, June 8, 1860.

Field Meeting at Topsfield.—The first of the series of Field Meetings, held by the Institute, this season, took place as above. The appointment had been made for Wednesday, the 6th inst., but unfavorable weather compelled a postponement. The early train from Salem took up a party of liberal dimensions, whose easy, "open order" stroll over the

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village green gave it a look of as great activity, perhaps, as it has shown since the days of May Trainings; unless in some excepted cases, when the "Cattle Show" may have wakened the quiet spot to equal, and perhaps more enduring animation.

Topsfield may stand as the central town of Essex county. It is located on land nearly as high as any, and for irregularity of boundary line, may fairly challenge any of the neighboring townships. But these peculiarities are of small moment, compared with that, which gives Topsfield the praise of rearing and preparing more schoolmasters than any other place, probably, in Eastern Massachusetts. Its small, square, "hip-roofed" Academy, occupying a pleasant little rounded knoll, just at one side of the village, stands as the monument of its own past usefulness, and an equal proof of the continuance of that usefulness in the present. A greater pride should this little structure be to Topsfield, than the Arch of Titus or the Temple of Minerva, if either occupied that little sunny knoll instead of it.

A dispersion of the company into parties soon took place; one betaking themselves to the enjoyment of the fine views to be observed from the summits of "Great Hill," and "Town Hill", over whose steep acclivities the unvarying Newburyport Turnpike forces its toilsome and almost dangerous way; and another going into an examination of the somewhat noted "Treadwell Farm", not long since bequeathed to the Essex Agricultural Society by its former proprietor. This party was well entertained by the keeper, Mr. Brown, under whose care several interesting experiments are progressing, in regard to the comparative efficacy of different manures. Here the Pasture Oak exists in fine condition, but the visitors noticed with regret the recent felling of some of these trees, and the thought naturally arose, that little was

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done by cultivators to replace such losses, beautiful and valuable as this Oak is known to be. Attention was, likewise, directed to two unusually large Locust trees, which had remarkably escaped the borer, till, in the case of one, a circumference of ten feet had been attained, four feet above the ground.

A third division made a rather longer jaunt toward the north, through fields and meadows and along the devious country ways, at one time very near the line of Boxford, and again, emerging on the bank of that very beautiful sheet of water called Pritchard's Pond, the greater part of which is included in Ipswich. This pond bears much resemblance to that in Middleton; but is less encompassed with woods; and having steep and elevated banks, is not, in the part visited, certainly, as easy of access as the other.

The various detachments returned in the neighborhood of noon and a general rendezvous was made at "Union Hall," in the basement of the Methodist Church, the use of which had been kindly tendered for the occasion. Not long afterward, the meeting was called to order by Vice President John L. Russell, and after the reading of the record the following donations were announced, received since the 9th ult.

To the Library—from Jonathan Perley; Peabody Institute, South Danvers; James S. Bryant, of Hartford, Ct.; George B. Loring; Trustees of the New York State Library; Middlesex Mechanic Association, Lowell; Canadian Institute at Toronto, C. W.; Henry F. Shepard; John B. Alley, M. C.; John W. Archer, of Brighton, Ill.; Philadelphia Academy of Natural Science; Boston Society of Natural History; J. I. Bowditch, of Boston; San Francisco Mercantile Library Association; C. Benj. Richardson, of New York; B. W. Stone; John C. Holmes, of Lansing, Mich.

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To the Cabinets—from E. Kirk Johnson of Nahant; S. P. Fowler of Danvers; Robert Brookhouse; Jason Wilkins; James R. Phelps; H. F. Shepard; W. J. Chever; Miss M. G. Wheatland; R. S. Rogers; John Bertram; Stephen Upton; George H. Hovey; Miss Sarah Kimball;—Frost of Marblehead; R. Wheatland; Charles Davis of Beverly; John Washington; William Shackleford; Wm. Lefavor; Miss H. M. Jacobs of South Danvers; John F. Ropes; James D. McMurphy; C. Cooke; W. H. Hall; G. F. Chever; R. Brookhouse, jr.; Henry E. Jenks; R. B. Forbes of Boston; George Harrington; James Upton; R. H. Wheatland.

Letters were read from N. S. Shaler of Newport, Ky.; A. E. Verrill of Norway Me.; Connecticut Historical Society; Trustees of Newburyport Public Library; Maine Historical Society; John C. Holmes of Lansing Mich.; State Historical Society of Wisconsin; C. M. Tracy of Lynn; R. Phillips of Topsfield; William Merritt of Salem; Smithsonian Institution; W. B. Trask of Boston; J. Colburn of Boston; M. A. Stickney; E. O. Proctor of South Danvers; Morris Spofford of Groveland.

The Chair introduced the exercises by some remarks on the history and purposes of the Institute, calculated to awaken an interest in the Institution in those who might thus learn its nature and objects.

John M. Ives of Salem, observed that this was not the first visit of this society to the town of Topsfield. Indeed, the first public meeting of the Essex County Natural History Society, one of the parents of the Essex Institute, was held here, at the old hotel, in 1834; and the first Field Meeting under the present organization was also held here, in the Academy Building, some four years ago. But he had fresh proof to-day that all our own territory was not yet com-

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pletely known, nor a perfect acquaintance had with its productions; for he had to-day found the Painted Cup (*Castilleia coccinea*) growing profusely in a neighboring meadow, when he did not suspect its existence in the town. This is a beautiful plant, making a notable feature in the landscape wherever it flourishes.

Dr. R. H. Wheatland of Salem, mentioned that he had been tolerably successful in securing specimens to-day, having found four species of fishes, four of frogs, three of turtles, and one of snakes; and he proceeded to offer remarks upon their structure, growth, and habits. The animals of our own region are not less interesting than the rarest foreign species, though every country and climate has its peculiar grade and style of animal life. He proceeded to illustrate the correspondence between animals and the situations they are formed to inhabit, by some specimens of the curious "Blind Fish," so often heard of, from the Mammoth Cave of Kentucky, and also a fresh water crab (*Astacus fluviatilis*) from the same locality. These specimens were brought from thence by Mr. B. C. Putnam of Wenham.

The Chair gave some descriptive observations on a specimen of the "seventeen-year-locust" handed in by Mr. Felt. These are said to do but little harm singly, but the immense multitudes in which they often appear, commit great devastation wherever their track happens to be. In the timely destruction of such pests, lies the usefulness, too little admitted, of such birds as crows and robins. The cultivator can see that these attack his fruit, and he therefore judges them his enemies, but he does not see, and rarely stops to inquire, what incalculably greater good they do in their vigilant pursuit of these insect destroyers, more than repaying the loss of a few handfuls of berries in a season.

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Samuel Todd of Topsfield, invited attention to the gravel pits in the vicinity. The general formation in this place is sandy, but in the midst of it appear three knolls of gravel, evidently originating somewhere else, and probably brought from the far north by drift currents. Dr. Kane tells us of red gravel covering the polar ice for miles, and it would seem that such agencies are even yet at work breaking down the solid rocks and scattering the debris southward.

The Chair pursued the subject in some remarks, regretting the absence of our Geological member, B. F. Mudge, of Lynn, lately removed to the West.

C. M. Tracy of Lynn, summed up the results of the botanical rambles of the day, having found the following, among many more common plants:

Bulbous Arethusa, (*Arethusa bulbosa.*)
Purple Avens, (*Geum rivale.*)
Painted Cup. (*Castilleia coccinea.*)

The two first from a meadow north of the village, and the last from one about half a mile to the east. It makes a gorgeous appearance there, coloring the herbage, as it were, for many square rods. This is a peculiar variety having the bracts a deep orange color, instead of the fine scarlet commonly seen. If this plant could be cultivated, it would be a choice thing for the garden, but it is thought to be parasitic by the roots, like the Gentians, which would render its growth impossible, except in spots of its own choosing.

Mr. Osgood Perley exhibited and presented to the Cabinet one of the interesting concretions taken from the stomach of the Ox. It consisted, evidently, of hair licked from the animal's coat and swallowed, after which, by the motion of the stomach, it became "felted" and hardened together into a solid ball.

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The Committee on Field Meetings announced that the next would be held at Groveland, Wednesday, June 27, if favorable weather.

The thanks of the Institute were then voted to the proprietors of the Methodist Church for their kindness in admitting us to their commodious hall; also to Messrs. Phillips, Adams, Merriam, Holmes, Peabody, Leach and others, for their polite and gratifying attentions to the members this day. Adjourned.

There were on exhibition outside the Hall, two beautiful living specimens of ornithology; one of the White Headed Eagle belonging to Eleazer Lake of Topsfield, captured in December, 1858; the other of the large White Owl, taken in December last, and owned by George Killam of East Boxford. This did not appear to be the Snowy Owl, but rather an albino of some other species. Both were healthy and attracted much attention.

Wednesday, June 27, 1860.

FIELD MEETING AT GROVELAND.—The Institute visited this place in September last, and most of the local features of interest may be found noticed in the account of that occasion. To-day the rendezvous was at the same spot as before, viz: Balch's Grove, whose owner, William Balch, is still living, having reached the age of ninety-three, with faculties almost unimpaired. On the walk from the station to this place the party were led to notice a hill whose loose soil, now overgrown with rye, anciently served for an Indian burial ground. The bones of the red men are not yet wholly wanting on the spot, being now and then disturbed by the unthinking ploughman; and more than once, it is said, the frost has gradually lifted the remains till the skele-

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ton emerged from its resting place in the same sitting posture in which it was first interred.

There was no lack of pleasant entertainment for the explorers to-day, who spread about in various directions according to the demands of their differing fancies. Some visited the huge bowlders on the land of Mr. Abel Stickney, heretofore mentioned; others examined the river-banks and their productions, as well as those of the ancient stream itself. A few took ferriage across to the flourishing town of Haverhill, which boasts so much of historic interest and modern enterprise, and there passed the forenoon in researches into the matters pertaining to the place, both new and old.

The afternoon meeting took place at the Independent Church, at 3, P.M. The Chair was occupied by Vice-President Russell, who favored the meeting with remarks sufficiently extended to atone for the want felt by reason of the absence of other speakers.

The following donations were announced, as received since the meeting at Topsfield.

To the Library—from Ohio Mechanics' Institute, Cincinnati; N. J. Lord; Alfred Poor of Haverhill; Wm. Stearns; H. M. Brooks; N. Y. Mercantile Library Association; Chicago Historical Society; Samuel Green of Boston; S. C. Jackson of Andover; E. Hervey Quimby; Philadelphia Academy of Natural Science; N. Y. State Library; J. L. Russell; Jeremiah Colburn of Boston; Mrs. N. Ingersoll; G. F. Read; Geo. Andrews; Congregational Library Association.

To the Cabinets—from Arthur M. Merriam, Topsfield; Osgood Perley of Topsfield; R. H. Wheatland; B. F. Browne; S. Lewis jr.; Miss M. G. Wheatland; C. H. Nor-

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ris; Geo. Dodge of Wenham; Jason Wilkins; Caleb Cooke; Mrs. W. B. Johnson of Cohasset; N. B. Baker of Clinton, Iowa.

Letters were read from Trustees of Newburyport Public Library; Smithsonian Institution; Trustees of Boston Public Library; Massachusetts Historical Society; M. Spofford of Groveland; W. Merritt; A. Ordway of Boston; M. Miles of Flint, Mich.

The Chair proceeded to give a pleasant account of his own rambles during the day, and the various objects of interest which had become known to him thereby. The study of botany, always a favorite with him, was far from being without value to others—to all, even the scientific and somewhat technical forms of it. No farmer should be destitute of this knowledge. "Here" said he, "is a plant from New Zealand, a sort of Spinach, raised by one who bought the seed under the supposition that it was parsnip seed. A little *accurate* knowledge of botany would have certainly prevented a blunder so very awkward and troublesome."

He further exhibited various other plants, among them the *Tephrosia*, known commonly as "Catgut," for its long and tough fibrous roots, or sometimes as "Hen and Chickens." It is a pleasant looking denizen of the damp boggy lands, and belongs to the great Pea family.

The Tulip Tree (*Liriodendron*) had been brought up from Danvers by Dr. Osgood. This fine tree is native as far north as the interior of Massachusetts, penetrating further in this direction than almost any other of the Magnolia tribe. Its beauty is not to be questioned, and its utility is scarcely less; its wood being soft and light, and valued by wheelwrights and joiners, who use great quantities for paneling, under the name of Whitewood. Many specimens of our beautiful *Kalmia* or Mountain Laurel, were also shown; and proceeding from this, he remarked that the beauty of

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our own plants was far superior, in general, to that of the European. Neither could Europe vie with us for variety and diversity of vegetation. The whole number of species of native trees, of all kinds, now to be found in Great Britain, was not as great as the number of oaks alone described as belonging to the United States.

Jacob W. Reed of Groveland, author of a genealogical history of the Reed family, gave a synopsis of the facts and speculations to which he has given much attention, as to the topographical history of the Merrimac River. The abrupt angle by which the stream turns, a little above Lowell, from its nearly southerly course, to one almost northeast, has occasioned much thought among those interested in such changes. "Now the fact is," said he, "that from this bend a valley extends southward, in very nearly the primary direction of the river, and terminates in Boston harbor. Had the river been stopped back by obstructions across its present bed at Lowell, it would have continued on through this valley and flowed into Boston harbor instead of where it now does." He thought this was anciently the case, and thus the Merrimac has lent its aid in the formation of that harbor. But this natural dam having once given way, the waters turned northeasterly until some other and similar stoppage took place, sending the current southward again. This seems to have happened several times and in one instance the stream had its outlet in the harbor at Salem. At a point near "Rocks Bridge" the latest obstacle seems to have existed. The Indians formerly had a tradition, that the mouth of the Merrimac was near that of Parker River, thus leaving Newbury on the northern side.

Mr. R. further gave some interesting statements as to the *Indian* remains found at "Ridge Hill" before spoken of.

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Rev. Mr. Willson of Salem, offered some brief remarks on the value of knowledge, even that little which has been styled a dangerous thing.

On motion, the thanks of the Institute were then presented to the proprietors of the Independent Church for the use of their house, also to Messrs. Spofford, Parker, Savory, Reed and others citizens of the town for their kind attentions during the day, and the meeting then adjourned.

Monday, July 16, 1862.

Field Meeting at West Gloucester.—This place became the locality of the third of these pleasant occasions this season. It is not a very large or populous village, and a slight survey is enough to show that not a large amount of travel passes this way, at least to make any stay in this vicinity. Yet it is certainly not for want of pleasant scenery, and local matters attractive enough to the eye and heart, but not, perhaps, to the money-seeking enterprise of the present day.

The town of Gloucester may rank as one of our oldest daughters of Essex, having been incorporated originally in 1639, three years before it received its present name. The West Parish dates back in its corporate existence, to 1716, when Rev. Samuel Thompson was settled as its minister; but the old meeting-house, which was only taken down within some ten years, had the date of 1713 on its sounding board, and the ornamental carving, with the year upon it, is yet preserved in a beer store in the village. The meeting-house was about forty feet square, and stood about two miles from where the Institute assembled, on a spot which the forest has now overgrown.

A company of liberal magnitude attended the meeting

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to-day, though, as usual, not all coming at the same time, or by one route. One division had started early, and gone by a more extended road to explore the ever-famous Magnolia swamp, not far away. This spot always figures prominently in the attentions of the members, when anywhere in its neighborhood, but not every one, who visits it, brings away full satisfaction or dry feet. The magnolia is certainly there, genuine and lovely, but the plants are grown scrubby through rude and frequent breakage, and the blossoms never abundant, are made rarer yet by unscrupulous rangers, who bid fair to destroy the bushes in their eagerness for a two-penny traffic in the half-opened flowers. Still the Magnolia Swamp will not answer to be neglected by the botanist, for it contains many rare and beautiful plants beside that for which it is named. The Inkberry (*Prinos glaber* or *Ilex glaber*) a close relative of the Holly, revels in the bogs in profusion, its bright evergreen foliage alike cheerful in summer and winter. The White Fringed Orchis (*O. blephariglottis*) lifts its spikes of pure white flowers here and there, and the Clintonia, named after the worthy DeWitt Clinton of New York, here and there fills large spaces with its broad leaves of brightest green, and adorns them with its little golden lilies first, and blue berries afterward. The structure of this swamp appears peculiar, for very little earth or soil of any kind is to be met after leaving the margin, but instead, one level expanse, crowded and packed with Sphagnum or peat moss. This, growing continually at the surface and decaying below, preserves its condition of a soft, compact, elastic cushion, full of water, but free from mud, green as grass at the top, and furnishing an excellent foothold for all kinds of vegetation.

The morning party being thus engaged with this and other notable spots at some little distance from the rendezvous, the latter, and more thoroughly pleasure-hunting company

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turned their care to other objects. Some started for the other villages of Gloucester to evoke whatever historical wonders might be slumbering about them. Still more, and in fact nearly all the residue, set off to climb the tallest eminence in the town, known as Thompson's Mountain. This eminence, noted by Babson as 255 feet high, has had its celebrity finally established by being made a signal station by the United States Coast Survey. After a warm and rather weary walk, the summit was reached, and from the stern and almost naked rock which forms it, the party looked about on a prospect of admirable diversity and extent. Immediately about the foot of the mountain lie the dense woods that occupy all the western part of the town. Beyond are seen the goodly buildings of the Harbor Parish, or Gloucester proper, toward the southeast; the more scattered ones of the old Town Parish on the east; with Annisquam (or Squam, familiarly) on the northeast, and Essex, nearly in the west; all making up a charming picture of the homes and haunts of Cape Ann, backed in the distance by Plum Island, Coffin's Beach, and the blue surges of the broad Atlantic. Far away, the eye catches in the northwest, the lofty swell of Holt's Hill in Andover, and still further, the blue and ghostly peaks that represent three more of New England's sisterhood of states, Agamenticus in Maine, Gunstock in New Hampshire, and Beaconpole in Rhode Island. These are all signal stations of the survey, and here the company found Mr. Hassler, the assistant in charge, who with his instruments, was very polite, and ready to add what he might to the pleasure of his visitors.

After the reuniting of the various divisions, and the discussion of the refreshments made doubly acceptable by the invigorating jaunt, the afternoon meeting was called to order by Vice President Russell, under the shadow of a spreading apple-tree on the grounds of a West Parish farmer.

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Donations to the Library and Cabinets were announced as follows:

To the Library—from the Trustees of the New York State Library; C. B. Richardson of New York City; Boston Society of Natural History; Thomas Fettyplace of Mobile, Ala.; Zaccheus Gould of Topsfield; Henry M. Brooks; Nathaniel Paine of Worcester; George C. Chase; N. Y. Mercantile Library Association; Connecticut Historical Society; Mrs. N. D. Cole; George F. Read; R. H. Wheatland; Henry F. Shepard.

To the Cabinets—from H. M. Brooks; Thomas Fettyplace; F. H. Lee; J. C. Lee; R. S. Rogers; James Bartlett of Wenham; Joseph True; Richard H. Wheatland; Chas. H. Price; Benjamin F. Morrison of Nantucket; L. E. Evans; Chas. H. Norris; Elliot F. Smith; William Clough.

Letters were read from the Trustees of the New York State Library; Smithonian Institution; B. F. Morrison of Nantucket; F. B. Perkins of Hartford, Conn.; Jeremiah Spofford of Groveland.

The chair, on opening the exercises, recounted some of his excursions and adventures during the day, and added a pleasant description of several species of plants.

S. P. Fowler of Danversport followed, with a further discussion of the flora of this peculiarly fertile region, fertile, at least in vegetable rarities. Mr. F. went somewhat largely into the consideration of those plants which had come under his notice in this day's rambles.

Rev. C. C. Beaman of Salem, had gleaned a few facts of interest concerning the old meeting house and had also paid a visit to the parsonage, another ancient institution of the place, on which he based some entertaining remarks. He further spoke of several notable localities in this region in-

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cluding that known as Hog Island, the birthplace of the Hon. Rufus Choate.

A. B. Almon, of Salem, responded briefly to the call of the chair, alluding to the various events and circumstances of the occasion in a very agreeable manner.

Prof. A. Crosby of Salem, went into some account of the excursion to Thompson's Mountain, of the characters of that eminence and the fine view commanded by it; also, of the operations of the Coast Survey in this locality, and the explanations of the same given by Mr. Hassler.

S. P. Fowler of Danversport, followed with some remarks on the habits of our native birds, and the changes which these habits appear to be undergoing, principally in consequence of civilization, and the new state of things continually introduced by man.

John M. Ives of Salem had read some curious and interesting observations on the same subject, a few of which he recounted to the meeting.

George F. H. Markoe presented the following Catalogue of Plants, observed by him, in flower or fruit, during the excursion in the vicinity of the place of meeting.

Thalictrum cornuti, Meadow Rue.
Ranunculus bulbosus, Bulbous Crowfoot.
" *acris*, Tall Crowfoot, Buttercups.
Aquilegia canadensis, Wild Columbine, flower and fruit.
Magnolia glauca, Small or Laurel Magnolia.
Berberis vulgaris, Com. Barberry, fl. fr.
Nymphœa odorata, Sweet-scented Water Lily.
Nuphar advena, Yellow Pond Lily.
Sarracenia purpurea, Pitcher Plant, fr.

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Chelidonium majus, Celandine.
Papaver somniferum, Com. Poppy.
Sinapis nigra, Black Mustard.
Capsella Bursa-pastoris, Shepherd's Purse.
Sisymbrium officinale, Hedge Mustard.
Drosera rotundifolia, Round Leaved Sundew.
" *longifolia*, Long Leaved Sundew.
Hypericum perforatum, Com. St. John's-Wort.
Silene inflata, Bladder Campion.
" *noctiflora*, Night Flowering Catchfly.
Stellaria media, Com. Chickweed.
Cerastium vulgatum, Mouse-ear Chickweed.
Malva rotundifolia, Com. Mallow.
Tilia Europæa, European Linden.
Oxalis stricta, Yellow Wood-Sorrel.
Rhus typhina, Staghorn Sumach.
" *glabra*, Smooth Sumach.
" *venenata*, Poison Sumach or Dogwood.
Ceanothus Americanus, New Jersey Tea.
Trifolium arvense, Stone or Rabbit Foot Clover.
" *pratense*, Red Clover.
" *repens*, White Clover.
" *procumbens*, Low Hop Clover.
Spiræa salicifolia, Com. Meadow Sweet.
" *tomentosa*, Hardhack.
Geum album, White Avens.
Potentilla Norvegica Floribunda.
" *Canadensis*, Com. Cinque foil.
" *argentea*, Silvery " "
Rubus villosus, High Blackberry.
Rosa Carolina, Swamp Rose.
" *lucida*, Dwarf Wild Rose.
" *micrantha*, Small Fl. Sweet Briar.
Epilobium angustifolium, Great Willow Herb.

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Œnothera biennis, Com. Evening Primrose.
Aralia nudicaulis, False Sarsaparilla, fl. fr.
Cornus Canadensis, Dwarf Cornel, fr.
Sambucus Canadensis, Com. Elder.
" *pubens*, Red Berried Elder.
Mitchella repens, Partridge Berry.
Oldenlandia cærulea, Bluets.
Eupatorium perfoliatum, Thoroughwort.
Rudbeckia hirta, Rudbeckia.
Leucanthemum vulgare, White Weed.
Leontodon autumnale, Fall Dandelion.
Taraxacum dens-leonis, Dandelion.
Lobelia spicata, Pale Lobelia.
Gaylussacia resinosa, Black Huckleberry, fr.
Vaccinium macrocarpon, Cranberry.
" *vacillans*, Low Blueberry, fr.
" *corymbosum*, Swamp Blueberry, fr.
Gaultheria procumbens, Checkerberry.
Clethra alnifolia, White Alder.
Kalmia latifolia, Mountain Laurel.
" *angustifolia*, Sheep Laurel.
Pyrola rotundifolia, Round Leav. Pyrola.
Chimaphila umbellata, Prince's Pine, Pipsissewa.
Monotropa uniflora, Indian Pipe.
Plantago major, Com. Plantain.
" *lanceolata*.
Lysimachia stricta, Bulb-bearing Loosestrife.
" *quadrifolia*, Four Leaved Loosestrife.
Verbascum thapsus, Com. Mullein.
Linaria Canadensis, Wild Toad Flax.
" *vulgaris*, Toad Flax. Butter and Eggs.
Veronica scutellata, Marsh Speedwell.
Melampyrum Americanum, Cow Wheat.
Mentha Canadensis, (M. borealis) Wild Mint.

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Hedeoma pulegioides, American Pennyroyal.

Nepeta cataria, Catnip.
" *glechoma*, Ground Ivy. Gill.

Brunella vulgaris, Self Heal or Heal All.

Leonurus cardiaca, Motherwort.

Calystegia sepium, var. repens, Hedge Bindweed.

Solanum dulcamara, Bittersweet.

Apocynum androsæmifolium, Dogbane.

Asclepias cornuti, (A. Syriaca,) Milkweed.
" *phytolaccoides*, Poke "

Phytolacca decandra, Poke. Garget.

Polygonum persicaria, Lady's Thumb.
" *aviculare*, Door Weed. Goose Grass.

Rumex obtusifolius, Bitter Dock.
" *crispus*, Curled Dock.
" *acetosella*, Field or Sheep Sorrel.

Sassafras officinale, (Laurus Sassafras) Sassafras.

Corylus rostrata, Beaked Hazel Nut.

Myrica gale, Sweet Gale.
" *cerifera*, Bayberry, Wax Myrtle.

Comptonia asplenifolia, Sweet Fern.

Sagittaria variabilis var. sagittifolia, Arrow Head.

Pogonia ophioglossoides, Pogonia.

Calopogon pulchellus, Calopogon.

Iris versicolor, Blue Flag.

Sisyrinchium Bermudiana, Blue Eyed Grass.

Smilax rotundifolia, Com. Greenbriar.

Lilium Philadelphicum, Philadelphia Lily.
" *Canadensis*, Wild Yellow Lily.

Polypodium vulgare, Com. Polypody.

Aspidium marginale, Shield or Wood Fern.

Polytrichum piliferum, Hair Cap Moss.

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Mr. Beaman proceeded to speak of the very kind and cordial reception met by the Institute in this place to day. In recognition of these hospitalities, he submittted the following, which was unanimously adopted.

Resolved, That the thanks of the Essex Institute be tendered to Mr. John Bray, who owns the ground where this meeting is held; to Messrs. Theophilus Herrick, Jr., John T. Davis, and other citizens, for their kind attentions; to Mr. Hassler of the Coast Survey who was very attentive upon Thompson's Mountain; to the Proprietors for the use of Liberty Hall; and to the Rev. Charles Smith for tendering the use of the Parish Church.

The meeting then adjourned, and the company, to the number of about two hundred, returned home with much pleasure from the excursion.

Thursday, August 2, 1860.

Field Meeting at Hamilton.—This was the fourth meeting this season, and one of the pleasantest of all. The spot selected for the gathering was in the midst of the Hamilton Ponds, so called, which, five in all, are situated in the adjacent corners of Hamilton, Wenham and Essex. All these being connected, finally reach the sea by means of the largest, Chebacco, or Essex Pond, delivering its waters into Essex River. A very worthy establishment is kept by Mr. John Whipple, on the road between Beck's and Chebacco Ponds, in a most attractive situation; and this was reached to-day by a large company, most of whom arrived by the Eastern Railroad, having a rather long ride, or walk, from the Hamilton Station, and the rest by pleasant drives over the various roads that traverse this region.

The forenoon was spent by some in pleasure excursions around the shores of the ponds, or in the diversified pastimes

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of rowing, sailing and fishing, in and from the numerous boats with which these waters are well provided. Others made scientific explorations here and there, while others, as usual, gave attention to whatever of antiquity and historical interest the vicinity might afford.

Some three hundred persons assembled on the shady platform of Mr. Whipple, and, neither the President nor Vice President being present, Hon. Allen W. Dodge of Hamilton was called to the chair.

The following announcements of donations were then made.

To the Library—from Henry F. Shepard; T. J. Hutchinson; George C. Chase; Joseph W. Stone; Martyn Paine of New York; E. M. Stone of Providence R.I.; John L. Russell; Smithsonian Institution; Massachusetts Historical Society; Philadelphia Academy of Natural Science; Canadian Institute at Toronto C.W.; Samuel A. Green of Boston; N. J. Lord.

To the Cabinets—from R. H. Wheatland; Charles A. Putnam; J. Burchstead of Wenham; Charles F. Williams; David Moore; John Rider; J. M. Ives.

Letters were read from F. B. Perkins of Hartford Conn.; M. Miles of Flint Mich.; Trustees of New York State Library; F. W. Putnam; A. W. Dodge of Hamilton; David Choate of Essex.

The Chair then entered into a very happy vein of remark, by way of welcoming the Institute to the town of Hamilton. In this address, which though extended, commanded the close attention of all, the following noticeable points were noted.

Hamilton, with an average territory, is strictly rural, with

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only about nine hundred inhabitants. Manning's Mills on Ipswich River, is its only manufacturing concern, and that is not a large one. The town was set off from Ipswich in 1793, and named in honor of the celebrated Alexander Hamilton. Some twenty years ago, a proposition was made that this name should be surrendered and a new one taken, so that a manufacturing village in the west of the state might be called after the great American Statesman, but the idea met with no favor whatever.

This place has the honor of being the home of the Rev. Manasseh Cutler, a man of lovely character and brilliant talent, and of whom very much has been written already. He represented this district in Congress from 1800 to 1804. But he was better known as a naturalist especially in the department of Botany; and at his house, yet standing, he was often visited by men of science from abroad.

Felt, in his History of Ipswich, has noted the fact, probably unparalleled, that in certain families of the name of Appleton, residing here, there inheres a strange tendency to bleed profusely from the slightest wound. These "bleeders" as they are called, are all the sons of daughters in the direct line of descent; and no female or sons of males in the line are ever known to exhibit this peculiar condition. The hemorrhage begins in eight or nine days after the injury, and continues in spite of all efforts to the contrary, till extreme prostration and sometimes death ensues. This wonderful phenomenon has never found any explanation.

The Chair also spoke of the potato rot, a malady which we know next to nothing about, save its disastrous effects. Appearances favor the opinion that it has an atmospherical cause, and is not due to insects, as some maintain; but whatever it be, it seems declining, and we hope it may soon disappear.

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Some remarks on vegetable instinct, and an eloquent tribute to the utility and happy character of the Field Meetings, closed this address, which met throughout the hearty approbation of all.

Dr. George Osgood of Danvers said that he had been both pupil and friend of Dr. Cutler, whose name is so dear to the people of Hamilton. He had rambled in these woods with him fifty-five years ago, when he stood as one of the pioneers of American Botany. From him he had his first lessons in that study of nature, which during a long life, have given him such pleasure and instruction. He proceeded to discuss the characters of the Tulip Tree (*Liriodendron tulipifera*) and the Catalpa, (*C. bignonioides*) giving some statements as to their rate of growth and value as ornamental trees. In the rambles of the forenoon he had collected many beautiful plants, such as the Purple Orchis (*Platantherapsycodes*) Buttonbush (*Cephalanthus*) and Indian Pipe, (*Monotropa*).

S. P. Fowler of Danvers read the following essay on the *Changes produced by civilization in the habits of our common birds.*

Civilization has produced no greater changes in our country, than it has in the habits of our common birds. Our occupations, architecture, mode of cultivating the soil, habits, opinions, and even our legislation, serve to produce this change. The establishment of a fort, or fur post in the Indian country, or the opening of the forest for a clearing, by the squatter, effectually and at once changes the mode of life of many of our birds. Thus we see the near relation they sustain to us. But I wish more particularly to notice at this time the changes that have taken place in the habits of our birds in Essex County, during a period of fifty years. None have been noticed, I think, in our rapacious birds. They have become less numerous than formerly, although they continue to breed among us. The Baltimore Oriole still con-

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tinues to construct her nest after the old pattern, but has learnt to weave it from materials furnished by civilization. I have a beautiful nest of this bird, made wholly from materials swept out of the door of a milliner's shop, woven and interlaced with ribbons and laces and other fine things that ladies wear, including a threaded needle, that girls so often lose. In regard to the singular habits of the Cow-Pen-Bird in not building nests of its own, but laying its eggs in other bird's nests, and leaving them to the care of a foster parent, there seems to have been no change, for many years at least. All our ornithologists have failed as yet to account for the vagrant habits of this bird. Darwin, in his Origin of Species has at length, as he supposes, solved the mystery. The habit as seen in the European Cuckoo, which is similar to the Cow-bird, he thinks arises from the slave-making instinct of animals. He reasons in this way: Now let us suppose that the ancient progenitor of our European Cuckoo, had the habits of the American Cuckoo; but that occasionally she laid an egg in another bird's nest. If the old bird profited by this occasional habit, or if the young were made more vigorous, by advantage having been taken of the mistaken instinct of another bird, than by their own mother's care, encumbered as she can hardly fail to be, by having eggs and young of different ages at the same time; then the old birds, or the fostered young, would gain an advantage. And analogy would lead me to believe, that the young thus reared, would be apt to follow by inheritance, the occasional and aberrant habit of their mother, and in their turn would be apt to lay their eggs in other bird's nests and thus be successful in rearing their young. By a continued process of this nature, the strange instinct of our Cuckoo could be and has been generated.

Some modern naturalists have noticed among some animals, certain aberrant and mutilated forms, and established what they term the theory of degradation. And, for an example, they give us the misplacement of parts, such as are now exhibited in some fish, such as the flounder, turbot, and halibut. These are supposed to have once moved about upright, like most fish, but from some cause or other, a long time ago, they were thrown over and made to swim upon their sides, their squinting eyes stuck upon the top of their heads, and their mouths twisted awry. Some theologians

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say, that man even is in a state of moral degradation, and his affections misplaced. But I think we are precluded from supposing that the Cow Bird has at any period suffered from degradation or misplacement of its parts, thereby rendering it incapable of incubation, from the fact, that upon dissecting it, no disarrangement has as yet been found.

To my mind, it is evident, after giving the subject considerable attention, that the Cow-bird's unnatural habits are such as were given it, by the Author of its being, and are not the result of the slavery instinct, degradation, or the vice of habit. This is very evident, when we consider the singular fact, that when its solitary egg is deposited with those of its duped nurse, the parasite's egg invariably hatches from twenty-four to forty-eight hours before those of the foster-parent. Here we find a special provision made in favor of the Cow-bird, on which depends the continuation of the species. How Mr. Darwin can account for this, by his theory of slavery instinct, we cannot imagine. I have for many years noticed one or more young Cow-birds in my garden, reared principally in the nests of the Yellow-bird. Sometimes the eggs of the parasite fail to hatch, by a floor being laid by the owner of the nest over the egg and another story being added to the domicil. The wailing note of the young Cow-bird usually attracts the attention of my family, and they are amused in noticing the fond maternal kindness of the little step-mother, towards the large, chubby, sooty foundling. We have noticed for several years a change taking place in the habits of our Crow blackbird. They are becoming domesticated, like the Rook of England. This has been brought about by the planting of the white pine in our cultivated grounds. Wherever a cluster of these trees lift their heads thirty feet, they are visited by these birds for the purpose of breeding, even when growing in our populous villages. They are absent, for the most part, from their nests during the day, showing that they are not yet perfectly at home in their new location. The purple finch has likewise followed our cultivated evergreen trees into our grounds—a few years since, they were only to be seen in our cedar pastures, but they are now quite numerous. With me they breed on the branches of the spruce, and feed early in the season on the flower buds of the white elm, and when these fail, I am sorry to say, upon the fruit buds of the pear tree.

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The Cedar bird, which has become domesticated to a considerable degree, within a period of forty years, has discovered that our cultivated fruits are more juicy and palatable, than the hard dry berries of the Red Cedar. Hence the changing of its name, within my recollection, to Cherry-bird. It now wholly escheweth its former food and haunts, and while it has learnt to love our summer fruits, it has likewise acquired a relish for our canker worms.

The Robin is the most familiar bird we have, and has been the longest domesticated. This has taken place in consequence of its cherished name, early given to it by our ancestors, which led them to spare the bird—which name, by the way, more properly belongs to the Bluebird, its mild and quiet habits more nearly resembling the Robin Red Breast of England, than our ardent and vociferous fruit-eating thrush which we call Robin. The special legislation afforded the Robin in our Commonwealth, within a few years, has done much to completely domesticate them, and thus rendering them, in my judgment, a great nuisance to the fruit grower. If any law is necessary to protect our birds, it should be sufficiently broad to cover all of them. I would make no exceptions. The constant and cruel enactments, murderous deeds and mean contrivances to destroy and poison crows, would have resulted, long ago, in the destruction of the whole species, were they not very intelligent and sagacious birds, as fully able to take care of themselves, as those who are laboring to destroy them. Our present bird law is a queer piece of legislation, evidently drawn up by persons, who had not one particle of knowledge, sufficient to classify our birds into orders, deemed by them useful or noxious. For instance, no protection is given in the act to the Swallow family, Woodpeckers, Flycatchers, Wrens, &c., all perfectly harmless, injuring no one, and whose whole lives are spent in destroying noxious insects. I can shoot, or employ others to shoot all the birds above enumerated, every hour in the day, and every day in the year, when they are to be found, and no penalty would be incurred. But if I should shoot a Robin on my own ground, in the act of eating the last cherry, which he had overlooked on the tree, I should subject myself to a fine of two dollars!

The Swallow tribe has undergone more changes, probably, than any other order of birds. The Barn swallows have

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long since left their ancient breeding places, the overhanging cliff of rocks, and sought the habitations of men. The Chimney Swallow has deserted the hollow sycamore, its ancient home, for our unoccupied chinneys. The Cliff Swallow no longer frequents the shelving rock, but has sought shelter under our roofs. The same may be said of the Purple Martin and White bellied Swallow, as having left the uncultivated portions of the country, to seek protection in a home among the habitations of men. The Sand Martins are the only species which continue to rear their young in the river bank. Man's civilization has not as yet induced them to leave their ancient homes.

Great changes have been observed in the appearance and disappearance of the several species of swallows. During a period of less than fifty years, the purple martin has become comparatively scarce in the eastern part of Essex County. Some authors say, upon the authority of Prof. Kalm, that the purple martin was not seen in New England previous to the Revolution. But I have examined Kalm's travels in this country, and cannot find that he says anything about the appearance of the Martin. It is certain they were numerous in this vicinity, forty years ago, and that they are now very scarce. I think it is equally certain that the Barn Swallow is becoming less numerous. One of the causes, I think, which has led to this, is our modern tight barns, the poor swallow being as it were, shut out of house and home. On the other hand, Chimney Swallows have become very abundant. I can distinctly remember when they were rarely seen. The White-bellied Swallows have become likewise very numerous, and as they are so quarrelsome in their habits, that one pair can only agree to live together in a box, they are driven sometimes to great straits, to find a domicil. Last year, I discovered this bird, building in an old nest of the Baltimore bird. I was greatly interested at first in this discovery, thinking I had found at last, a new species of bird in my grounds. The nest retained its old outlines, but the swallow had fitted up its interior, so that it presented to me a different appearance. If Mr. Darwin's theory of slave instincts in animals be true, why may we not suppose that in time those white-bellied swallows that cannot find accommodations in boxes or such places as they would like, would

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acquire the habit of using old bird's nests; and when they cannot be found, attempt a forced entry into an occupied nest, wherein to deposit its eggs, and thus acquire the idle habits of the Cowbird.

In conclusion, I would say that, without doubt, many more changes in the habits of our birds, and the introduction of new species, will take place around us during the coming fifty years. The results following the opening of the Pacific Rail Road will not be confined to commerce and trade, for we see that plants invariably follow the track of these roads, and birds as surely follow vegetation. It is well known that rivers, mountains and coast lines, are used by birds to direct and assist them in their migrations, and why may not railroads. The voluminous Pacific Rail Road Reports themselves have brought to our notice many new birds, which we cannot fail to recognize when they arrive among us.

George D. Phippen, of Salem, had come to the meeting by that pleasant drive which leads through Manchester Woods. Here Flora was found to be in excellent circumstances, and beautiful plants in great variety were to be had for the picking. He exhibited Pyrolas, Cornels, etc. with the Beach Pea (*Lathyrus maritimus*) the Tufted Loosestrife (*Naumburgia thyrsiflora*) and the beautiful Willow-herb (*Epilobium.*) In answer to a question, Mr. P. sketched the outlines of the natural family to which the Sumac belongs, and noticed the various species of Rhus that grow among us, including the Poison Dogwood, (*R. venenata*) and the Poison Ivy. (*R. toxicodendron.*)

Dr. R. H. Wheatland, of Salem, responded to some inquiries by detailing the principal features in the development of the common Toad. The Toad deposits its eggs in the water in the latter part of April. They soon hatch, and the small pools may be seen almost black with the multitudes of spawn. These, in about seven weeks, go through all their changes and hop out on dry land as miniature toads, and in numbers almost without number; from whence they

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scatter in all directions. Their insatiable appetite for insects renders them great helps to the cultivator, though he has rarely been ready enough to confess his indebtedness to them. Different species require very different periods for full development, and some more than the common toad and some less; our knowledge about the matter, in detail, is very little.

Rev. C. C. Beaman, of Salem, made some pleasant remarks upon the natural beauties of this locality, and further spoke of some of the historical points raised by the chair.

Hon. David Choate, of Essex, author of an Essay on the Geographical and Agricultural Survey of the County, continued the topic of the last speaker. He had felt deeply impressed with the remembrance of the aboriginal red men, whose these delightful hills and waters once were. Not long since he saw one of these, a relic of Indian greatness, standing at the church door; and when, upon invitation, he addressed a few remarks to the children of the Sabbath School, he had listened to him with the most intense interest.

On motion of Mr. Beaman, it was then

Resolved,—That a vote of thanks be given to Mr. John Whipple, for the use of this spacious platform, or tent saloon, for this meeting of the Institute, for the courteous permission to use the grounds, and for other civilities to the large number in attendance; also to the several gentlemen of Wenham and Hamilton who have acted as guides to the party.

This meeting was very successful, and the large company appeared to enjoy the proceedings very highly.

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Thursday, August 16, 1860.

FIELD MEETING AT IPSWICH.—This, the fifth this season, happened to fall on the 226th anniversary of the incorporation of this sterling old town. A company of flattering magnitude arrived by the early train, and various explorations were speedily planned and put in forwardness. "Town Hill," probably the highest land in the place, received a large share of attention; another party found their way to Ipswich Beach; and yet others visited Castle Neck, where stands the lighthouse, and where is also located the farm and boarding-house of Capt. Humphrey Lakeman, a well known and worthy citizen of old Ipswich. He has always been prominent in public affairs, and equally given to hospitality and kind offices, till more than seventy years have ripened upon him in the midst of his good works. In this region the sand has played such antics as continually remind one of the wilds of Nubia, and the buried temple of Abou-Simbel. Whole apple trees of liberal size have been buried under the accumulating hillocks of shining white sand, till only the lesser, top boughs remain exposed; these however, still bear plenty of fruit. Ipswich has, until within a few years, enjoyed the honor of being the location of the Probate Office for this County, but that has now departed for a new position in Salem. The buildings devoted to this and the other Courts yet stand, but have suffered some alteration. The other County Institutions, the Jail, the House of Correction, and the Insane Asylum are still in active service; but much of the early consequence of the town is now lost. Very much remains to prove its antiquity; venerable dwellings, the time honored tavern, the academy, incorporated in 1828, the staunch old bridge built in 1764. The place, in fact, is all full of the antique, so far as any of New England can be. Two Englishmen were kindly received here in 1611. Three years later, Capt. John Smith, the famous, praised "Agawam"

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specially, as he did almost every other place along the coast. John Winthrop, son of the Governor, commenced a settlement here in 1633, and the next year "Agawam" was incorporated as "Ipswich," to bear the name with honor for more than two centuries.

Three o'clock, P.M. The formal meeting was called to order in the Town Hall, by Vice President Russell, who explained the objects and plan of the Institute, as usual. Donations were then announced, as follows:—

To the Library—from Henry M. Brooks; Zoologischen Gesellschaft, Frankfurt, a. m.; S. A. Green of Boston; Boston Society of Natural History; Philadelphia Academy of Natural Science; C. B. Richardson of New York; J. W. Stone; A. H. Sanger of South Danvers; John Andrew.

To the Cabinets—from J. M. Ives; Miss M. G. Wheatland; Henry Perkins; Edward Andrew; G. F. H. Markoe; A. H. Sanger of South Danvers.

Letters were read from the Department of the Interior; Smithsonian Institution; C. M. Endicott; S. P. Fowler of Danvers; and Dr. C. Johnstone of Baltimore, Md. The last named accompanying two small parcels of the "Nottingham Earth."

The following communication from Henry F. King was then read:—

The two small packets received from Doct. C. Johnstone of Baltimore, each containing a portion of earth from the same stratum, but from different situations above and below Nottingham, Calvert County, Md., have been submitted to microscopical examination. They belong, geologically, to the Miocene Tertiary formation of the United States, and in general characters agree with the infusorial earths from the Rappahannock River, Va.

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After a preliminary examination, we find them to contain, among others, the following fossil Diatomaceous Plants, viz :

Heliopelta Metii, Ehr.
Heliopelta Leeuwenhoekii, Ehr.
Heliopelta Euleri, Ehr.
Heliopelta Selligueii, Ehr.
Pyxidicula operculata, Ehr.
Pinnularia Couperii, Bailey.
Coscinodiscus gigas, Ehr.
Coscinodiscus radiatus.
Coscinodiscus oculus iridis, Ehr.
Gallionella sulcata, Ehr.
Actinocyclus undulatus, (Sinarius, Ehr.)
Navicula Bombas, Ehr.
Navicula striatula, var.
Craspedodiscus elegans, Ehr.
Zygoceros rhombus.
Sceptroneis caduceus, Ehr.
Podiscus Rogersi, Bailey.
Terceratium favus.
Dictyocha fibula.

The variety of earth from just above Nottingham is cleaner and appears to have more specimens of Heliopelta than that just below.

We agree with Doct. Johnstone in believing the Nottingham earth to be the same as Bermuda Tripoli ; at least we are now certain of another locality of the Heliopelta, heretofore considered so rare. A communication by Dr. Johnstone, arguing this point, was read at a meeting of the American Scientific Association recently in session at Newport.

In the year 1844, Prof. Bailey received from M. Tuomey Esq., of Petersburg, Va., a fine specimen of infusorial earth, labelled "Tripoli from Bermuda." Mr. Tuomey received it from some mineralogical correspondent, and had no doubt that it came from the Bermuda Islands. Collectors have sought in vain for it at those islands, and Bermuda as its locality has long since been given up. The Heliopelta and its varieties are abundant in Bermuda Tripoli and have not yet been noticed in any other earth, except the present Nottingham specimens. From this only specimen received by Prof.

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Bailey from Mr. Tuomey, specimens were sent to Prof. Ehrenberg, the celebrated German Naturalist, and by him distributed among the leading microscopists of the world.

The Nottingham specimens appear to be the same as the infusorial earths from the Rappahannock, with the exception, principally, that the Actinocyclus and some other forms in the latter, are replaced by the beautiful Heliopelta in the former, as in the Bermuda Tripoli. They are interesting to the geologist as showing the apparent resemblance of geological formations.

The statements of this communication were further commented on by the chair.

John M. Ives, of Salem, offered some remarks upon the various fruits now engaging the attention of the horticulturist.

The Chair exhibited a rose, from the center of which a green stem had been produced; a phenomenon not very rare, but full of botanical interest, the rationale of which he explained to the meeting.

George D. Phippen, of Salem, after making some remarks on the plants collected during the day, read the following communication on

The Instinct of Plants.

Whether this term be inadmissible or not, it cannot be denied that plants do exhibit actual sensibility, though of a low order, and that, in many cases, they have the power of "making movements tending to determinate ends."

The Creator has placed on the earth many races of sentient beings of high order, and these with such a structure and organization that their very existence here is made to depend upon the presence of another class of organized life, wholly distinct in characters from the first. This latter, feeding on the store of mineral and gaseous material around, is ever made to prepare, by assimilation, the aliment of those higher creatures known as animals. Thus these intermediate struc-

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tures, called plants, are made the grand elaborators of organic matter for the whole creation; and this first, though lowest manifestation of life becomes in this view as grand as any, perhaps, to be found in higher spheres.

Life, overwhelming in its mystery, is never deficient in self-sustaining power. It is a gift that none of its recipients have the least power to value. Yet it is given with a difference. One well says, "animals have, breathed into them, the breath of life; while plants are breathed upon." But both streams rise from one fountain, and are fanned by the same mysterious wing.

Life is not mere organism; implying growth certainly implies motion; and while the motion of animal life is full of evidences of what we, too blindly perhaps, call instinct, plants, confined and restricted, are not without something of the same kind.

The vegetable economy is full of motion. Roots move downward, seeking darkness and moisture, stems upward for air and light. An Indian grass no larger than a quill, climbs the highest trees to gain these two essentials. So of roots. The author of the Studies of the Essex Flora says of *Bidens connata*, "I have found vigorous plants growing in the crevices of the bark of trees, three or four feet from the ground, where the seed had been deposited by the water, when the pond by which they stood was unusually full, and a persevering root had in every case followed the retreating water till it had finally reached the earth."

While most motions of plants are apparently mechanical, others are as evidently spontaneous and voluntary. Some may be explained by the principles of endosmose and the peculiar laws that control the transmission of fluids. Setting all these distinctions aside, however, we only stop now to contemplate the wisdom that has adapted each to the special end in view.

By one of these spontaneous motions, everywhere to be seen, the upper side of the leaf is always turned to the light. This position is rigidly adhered to, even by a severe twisting of the petiole when the leaf has been designedly reversed, and whole fields of clover will thus turn their leaves to, and with the sun. Another of these movements has gained the name of "the sleep of plants," as it mostly occurs on the with-

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drawal of the sun. Leguminous plants exhibit it most freely; every one has noticed how the common Locust folds its leaves at night, and so keeps them till they are relaxed by the morning sun. The common Sensitive Mimosa takes on with something of violence, when touched, the same state in which it rests at night, yet this is hardly a state of repose or relaxation, but quite the reverse, being a somewhat strained or contracted condition. Composite flowers are slightly affected in the same way and close their heads at night and during storms. Such as the Dandelion, Succory, &c.

"Oft as light clouds o'erpass the summer glade,
Alarmed, she trembles at the moving shade;
And feels, alive through all her tender form,
The whispered murmurs of the gathering storm."

Many flowers open in the morning and close at night; but some reverse this rule, as the *Night-blooming Cereus*.

"Bright as the blush of rising morn, she warms
The dull cold eye of midnight with her charms."

The Evening Primrose opens its petals with some violence at night, and as some say, with a flash of phosphorescent light. The Four o'clock, opening late in the day, continues expanded all night, and droops in the morning, leaving its place well supplied by the *Convolvulus* or "Morning Glory."

Even the passing of a few clouds, or a slight shower, are enough to affect certain plants. Whole beds of tulips, previously drinking in the sunlight, to tinge their many colored robes, shut hastily with the plash of the first rain drops. The *Anagallis*, called the "Poor Man's Weather Glass" is more sensitive still, for, by repute, it anticipates these changes so truly, that fine weather always follows its expansion.

Such movements are natural, beneficial, and certainly, evidences of life; but whether they point to a real share of sentient happiness and consequent disposition to avoid danger, is not easy to say. Something like faintness is now and then seen among plants; the *Impatiens* or Jewel-weed droops so quickly, on being plucked, that its very life seems to exhale from the wound. We *see* no such exhalation; neither do we from the leaves of the forest, which send up clouds of vapor like a perpetual incense; if such were visible, we might gain more vivid ideas of vegetable life.

We notice also the means by which climbing plants ascend,

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and their consequent movements. The Grape, Pumpkin, Passion-flower, &c., move forward and upward by tendrils, seizing every support as animals do with their claws. The Bignonia and Ivy have fibrous processes, thrust into every crevice, carrying them up over surfaces of only the slightest inequality. There are *Galiums* and *Polygonums* that climb by the hooks and prickles of the stem. The Honeysuckle and *Convolvulus* make one tendril of the whole stem and ascend by this twining spirally, while the Dodder fastens and lifts itself by suckers that rob the plant to which they cling.

> "With sly approach she spreads her dangerous charms,
> And round her victim winds her wiry arms."

The *Clematis* employs the long petioles of its leaves, which have been compared to hands.

The *Celastrus* by its leaves and fine-drawn, spiral stems; the *Tropeolum* also by its leaves; and these, like many more, move upward thus in quest of light and air.

It is remarkable as well as inexplicable, that twining stems do not all turn in the same direction. The Morning Glory, Bean, &c., invariably turn "against the sun," W. S. E., but the Honeysuckle, Hop and others are equally tenacious of the opposite course, and turn always E. S. W.

The Sundew of our bogs is a very peculiar plant. Its leaves, glandular, and, as it were, jewelled all over, are sensitive to the tread of insects, who are often caught in these glutinous toils; and its graceful mode of flowering, uncoiling its raceme, to place the freshest flower at the highest point, has called forth the words of Darwin:—

> "As with sweet grace her snowy neck she bows,
> A zone of diamonds trembles round her brows,
> Bright shines the silver halo as she turns,
> And as she steps, the living lustre burns.

We see an instinctive purpose in the economy of the Peanut, for it buds and flowers in the air like any other, and then plunges its blossom into the earth, that the hot sun may not scorch the ripening seed. Much the same end is served by certain aquatic plants that only perfect their fruit under water. Of these last the *Valisneria*, growing at the bottom of ponds, lifts its fertile flowers to the surface for impregnation, and then, by a spiral coiling of the stem, draws down the fruit to ripen beneath the surface.

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Plants under difficulties will sometimes make what seem great exertions to ripen their seed and secure a progeny. Many are very sensitive just at the time of impregnation of the seed, the stamens and pistils making spontaneous movements to accomplish that end. The stamens of the *Kalmia* or Mountain Laurel, leap up toward the pistil with a jerk; and in the Barberry, this jerk is repeated as often as the filament is irritated. In the Saxifrage and *Parnassia*, each stamen in turn, bends down over the pistil, and in *Genista* and the Lupine, five stamens alternate with the other five in these approaches; while in *Nigella*, the stamens being too short to reach the pistil, it bends itself down and meets them.

Probably the closing of flowers at night or before rain is intended to preserve the pollen from extraneous moisture. Many of the Lilies and other bell-shaped flowers drop their blossoms for the like reason; but all these plants lift up the pod afterward most rigidly to be ripened in the sun.

The production of honey in flowers might be cited to illustrate this point; for by the agency of the insects that seek it, the pollen is spread and scattered more perfectly among the pistils. The Columbines and *Apocynums* afford good examples of this; those plants having catch-fly abilities are of this class.

Such are some of the wonders of plant life, visible to all. In microscopic research, a fresh mine of manifestations appears, not belonging to the present purpose. Vitality cannot be analyzed. It is the gift of God. In many respects its nature, as shown in the fixed vegetable and in the moving creature, is the same. Both have functions, and attributes, commensurate with their welfare; but animals alone have faculties, to which plants in no sense approach.

Rev. S. Barden of Marblehead, exhibited specimens of Indian implements of stone, and made some very interesting remarks thereon. He further spoke of his obligation to the Institute for the benefits he had here obtained; his strong interest in mineralogy, and the deep pleasure he thence derived, being all traceable to the Field Meetings, where they were first excited.

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David Pulsifer, the distinguished antiquarian scholar, formerly of Ipswich, was prepared to entertain the meeting with several articles, the result of his historical gleanings, but lack of time preventing, he substituted a few animated and pleasant remarks in the same vein, to the evident gratification of all.

After passing a vote of thanks to the Town authorities, of Ipswich, for the use of this Hall, to the several gentlemen who have acted as guides, and to the citizens generally, for their kindness and attentions during this visit of the Institute to their ancient town, hallowed by many associations, more especially as the adopted home of Oakes, a name endeared in the early annals of our Society and one of the most distinguished botanists of New England.

Adjourned.

Thursday, December 26, 1860.

Meeting, this evening, at the rooms, Plummer Hall, Henry M. Brooks, one of the Vice Presidents, in the chair.

Records of the preceding meeting read.

Donations received since the meeting in Ipswich, August 16, were announced:—

To the Library—from John L. Russell; John H. Stone; Samuel Colman of New York; R. B. Kerr of New Orleans, La.; Samuel A. Green of Boston; Philadelphia Academy of Natural Science; St. Louis Academy of Science; Connecticut Historical Society; Nathaniel Paine of Worcester; Wisconsin Historical Society; Pennsylvania Historical Society; Philadelphia Board of Trade; Moravian Historical Society at Nazareth Penn.; Stephen A. Chase; R. Manning Chipman, Walcottville, Conn.; N. J. Lord; Caleb Foote;

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S. S. Mackenzie of Topsfield; Canadian Institute, at Toronto, C. W.; Isaac P. Foster; New Jersey Historical Society; William P. Tucker of Brunswick, Me.; Vermont Historical Society; Nathaniel Ropes of Cincinnati, O.: Daniel C. Gilman of New Haven, Conn.; Henry F. Shepard; Oliver Warner, Secretary of State; William Brown; American Geographical and Statistical Society; Mercantile Library Association of New York; Boston Society of Natural History; Zoologischen Gesellschaft in Frankfort; H. F. G. Waters; Jeremiah Spofford of Groveland; E. S. L. Richardson of Chicago, Ill.; Town of Gloucester; G. F. H. Markoe; Mrs. N. D. Cole; John B. Alley, M. C.; Miss Rebecca Miller of Temple, N. H.; S. K. Whipple of Boston; Smithsonian Institution; David Pulsifer of Boston.

To the Cabinet—from William Clough; Matthew A. Stickney; B. F. Stedman of Milburn, Lake Co., Ill.; Augustus Fowler of Danvers; R. H. Wheatland; Elliot F. Smith of Keokuk, Iowa; S. S. Mackenzie of Topsfield; Miss Ellen Brown; Isaac O. Guild of Lynn; J. W. Standley; W. Mack; Isaac Chandler; G. F. H. Markoe; James S. Williams; C. L. Pierson; R. W. Bemis of Chicopee; Messrs. Phippen & Endicott; W. Perkins; R. Wheatland; Thomas P. Gentlee of Manchester; Charles H. Price; John Chamberlain; W. G. Webb; Charles Endicott; Henry P. Ives; Derby Pickman; Charles A. Putnam; J. Phillips; Miss H. R. Lee; George Fabens; Mrs. S. P. Fowler; M. Miles of Lansing, Mich.; N. C. Locke; George F. Reed; Daniel Currier; E. S. L. Richardson of Chicago, Ill.; L. Peirson Ward; F. W. Putnam; R. S. Rogers; Thomas Fettyplace; John W. Goodridge; Smithsonian Institution; W. B. Wyman of Marblehead; Francis F. Wallis; John N. Martin.

Letters were read from Historical and Philosophical Society of Ohio; Maine Historical Society; Trustees of New

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York State Library; Chicago Historical Society; New York Mercantile Library Association; Trustees of Boston Public Library; Corporation of Harvard College; Peabody Institute, South Danvers; Pennsylvania Historical Society; David Choate of Essex; N. J. Holden of Lynn; William Agge; Thomas H. Barnes; J. F. Webb, jr.; Adams Express Co.; S. P. Fowler of Danvers; M. A. Stickney; Joel Munsell of Albany; F. S. Pease of Albany; S. F. Nichols of Boston; S. A. Green of Boston; Wisconsin State Historical Society; R. C. Kerr of New Orleans, La.; M. Miles of Lansing, Mich.; Smithsonian Institution.

A. C. Goodell read a very interesting paper, giving a succinct account of the literary and scientific labors of James Tytler, who emigrated from Scotland to Salem in 1795, and died in the year 1804. Many of our older citizens will probably remember this eccentric and learned person, who resided in a small house on the Neck, a short distance from the Hathorne House.

After remarks from Rev. Mr. Beaman and Mr. J. Batchelder, a vote was passed thanking Mr. Goodell for his valua- communication, with a request that he would prepare the same for publication in the Historical Collections of the Institute.

Adjourned.

Monday, January 7, 1861.

Meeting this evening at 7.30 o'clock, Vice President, Henry M. Brooks, in the chair.

Records of preceding meetings read.

Donations announced from the following:

To the Library—from Henry M. Brooks; George C.

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Chase; S. A. Green of Boston; Tennessee State Library; N. J. Lord; H. F. Shepard; Henry E. Jocelyn; Mrs. N. D. Cole; C. Foote; James B. Curwen.

To the Cabinets—from Charles H. Buffum; George Harrington; Samuel V. Shreve; Mrs. N. D. Cole; Henry E. Jocelyn.

Letters were read from John C. Holmes of Lansing, Mich.; M. Miles of Lansing, Mich.; S. A. Green, Librarian of State Library of Tennessee; C. B. Richardson of New York.

The following communication from S. S. Mackenzie, of Topsfield, was read by the Secretary.

The Local Geology of Topsfield.

In speaking of this, the numerous hills, as being the most prominent objects, deserve first to be noticed. The most southerly of these, called, from the present owner, Pingree's Hill, begins near Nichols' Brook, so called, and rising gradually, attains its highest elevation at what was formerly known as Estey's Hill, from which it declines southeasterly in the same easy slope, till it is lost in the Wenham meadows. This might be called a series of hills, rather than one; the whole elevation consists of swells or ridges, like waves of the ocean rolling in from the northeast; and these ridges continue all the way from Ipswich River to the town of Danvers, with a constant range from north-west to southeast. Pingree's Hill, the highest ridge, is about 200 feet above the river-bed, and not far from two miles long.

Next, on the northerly side of the river, and in the western portion of the town, we have Lake's Hill. It is so named on the County Map; but many prefer to call it Gould's Hill. Indeed, families of both names have occupied it nearly two centuries. For still another name, the older inhabitants recognize it as "Billingsgate Hill." This is also formed of swelling ridges, still ranging N. W. & S. E., with a rather abrupt termination at the northwesterly extremity. Its whole length is about a mile, the noted Treadwell Farm

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lying not far from one end. An old burial-place, now bare of monuments, is found on the southern slope, and tradition ascribes its occupancy to families of the name of Stanley.

Northerly from this lies Great, or Towne's Hill. On its southerly side the Topsfield Hotel once stood, on the site of the present house of Daniel Perkins. The summit is north of this point, and is called the highest point in town, though in this respect there is little difference between this and Pingree's Hill. Like the others, this has the wavy, ridgy surface, and is somewhat abrupt at the northwesterly end.

From this, moving southeasterly, we reach Bradstreet's Hill, which is a regular swell of land for more than half a mile. On its eastern side, however, it is broken by sharp ridges along the river meadow.

Northeasterly from Bradstreet's Hill, across the meadows and the river, rises Cumming's Hill, named from its former exclusive owners, though now its possession is shared by others. Tradition says that an ancient owner of this hill, named Howlet, gave it entire to a boy named Cummings, as a freedom present, and it is added, that the boy lived to the age of a hundred and three years. The hill is of the same general form as Bradstreet's, but somewhat higher.

Lamson's, or Third Hill is found a little further to the northeast. It has been known as "Thick Woods," but none but apple trees are on it at present. Here we have the structure of the large hills again; blunt and steep toward the northwest, furrowed and ridged through its length, and sinking gradually toward the southeast, where it continues into Hamilton.

Recrossing the river and moving northerly, Paine's Hill is reached, so called from a former owner, so says tradition. The westerly side is rather abrupt, and the easterly and northwesterly slopes are broken into knobs and ridges.

Easterly from Lamson's Bridge and beside the Ipswich Road, is a small elevation called, from its form, Round Hill. It was once planted with a single row of corn (or beans) which ran round it spirally to the top. Since then, however, part of the hill has been removed for the benefit of the highway. A willow grows on the top, planted there by one Benj. Hobbs, sixty or seventy years since.

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Bear Hill may be mentioned. This lies near the Georgetown Road, on the northerly side of the town. It has the same general form as the rest, and seems only one of a series of hills that begin near the Meeting House, in Boxford, and are known in some parts as the Perley Ridges.

This wavy or furrowed figure has procured for these hills many subordinate names, as the particular hillocks were regarded. Thus, Pingree's Hill includes Dwinnell's, occupied by the Danvers road, and Towne's, by that to Wenham, while another height is known as Peabody's, and Rea's Hill is a small ridge running into Danvers. Others might be named, but all belong to one general elevation. So of that undulation called Great Hill, which lies northeasterly from Towne's Hill (on which the Hotel stood). It has no claim to a separate consideration, forming, undoubtedly, with Towne's, only one real elevation.

The soil of these hills and its fitness for agricultural and other purposes, are next to be considered. In these respects all seem much alike. The soil is always loose, with sand and gravel, a small amount of clay, and stones, large and small, near the surface. On penetrating deeply, however, the earth becomes more compact and very firm. Water, enough for man and beast, has been obtained on all these hills by means of wells. Of springs flowing out at the surface, there is no lack, but wells have been dug to all depths, from ten to twenty-five feet, to obtain more convenient supplies. The deepest well ever dug in the town was at the Hotel. This was carried down to eighty-five or ninety feet; but the only water-vein that was found, occurred about twenty feet from the surface, and yielded some twelve gallons per day. As forty horses were to be kept at the place, this supply was thought too limited, and the work went on, to the above depth. But as the lower strata seemed even dryer than the upper, the effort was abandoned and the well stoned up. It filled with water, however, and has never been dry since, but yielded abundantly. At one time, considering that a bucket was never lowered in it further than forty or fifty feet, the part below, of some forty feet more, was filled with stones, as useless, and so remains without affecting the supply.

In 1855 a well was dug near Mr. Pingree's house, about

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twenty-one feet deep and fifteen feet in diameter. Here water was found about eighteen feet below the surface. The earth was compact clay and gravel with stones of all sizes. The whole was thoroughly mixed and and solidified; *no part of the earth or stones being in a stratified state*; yet there were small rounded stones that appeared to belong to stratified rocks. Among the mass were also pebbles of white quartz and of sandstone. In the course of the excavation there appeared what seemed once to have been a crack, or rent in the earth, once open and afterwards filled with gravel and sand. It was about six inches wide; and though very firmly filled, could be traced nearly to the bottom of the well.

The large hills are all composed of similar materials, and all reckoned good land for cultivation. No ripple-marks occur in any of those described, save at Round Hill. This is chiefly loam and gravel, resting on sandy loam, and was evidently thrown up by the action of currents of water, as indeed most of the small ridges may have been, ripple-marks being found in them as well.

The plains and meadows will repay a moment's notice. A large plain begins at the river near the Treadwell Farm, and extends northerly to Prichard's Pond. It has a gradual ascent at an angle of about one degree. It seems to continue northerly as far as the Merrimac, and to reach westerly from Towne's Hill to the hills in Andover, making due allowance for all the minor elevations as seen from some of the high hills.

The plains are apparently all composed of one class of materials. Soil, answering well for cultivation, forms the first layer of from two to twelve inches; coarse and fine gravel succeeds, with sand and small pebbles in layers, till at eight or twelve, sometimes twenty feet deep, according to location, quicksand and water are met with. This is true of most of the plain land, though near the brooks and meadows clay appears after passing the upper layers of earth. At many points, brick yards were worked at the time of the early settlers, but none of them at present. One of these was near the place once occupied by Jacob Averill.

The meadows here yield a large a large amount of peat of every grade and texture. In some of them, charred stumps, and charcoal from small sticks are found three feet or more

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below the surface, indicating that the swamps were burnt over before the peat was formed.

When we come to the examination of the Rocks and Minerals of Topsfield, the first object of attention is what is known as the "Copper Mine." Most that is known of this comes by tradition. It is said that an Englishman named Buntin, came here about 1760, and with some of the townsmen begun mining for copper. Three points were selected; one near the meadow, on land now of David Towne, and near the house of Elisha Towne, then living on the premises. From this they passed to another point near the junction of the roads, where they sunk a shaft; and again going up the hill to the northeast, they sunk a third one some forty feet deep, with a considerable chamber at the bottom, made by removal of this rock in the search for ore. The tradition continues, that they shipped a large quantity of the ore, or rock, for England; but as nothing was ever heard of it, it was supposed that ship and cargo were lost at sea. About 1838 these shafts were reopened, and in them some of the old mining tools were found, shovels, picks, &c. An examination was made as to the utility of again working the mine, but nothing was done further, as there appeared no prospect of profit.

The rock at these places is of a green color, and very hard when first broken up, but by exposure to the air, it crumbles down into slaty or scaly fragments. It can be traced nearly two miles from the meadow above named, in an easterly direction. It appears near the surface just east of the house of Daniel Towne. It passes under the river at the old fordway, sometimes called the "Old Weirs." Still to the east the Newburyport Railroad cuts through it, near the house of David Perkins, to a depth of fifteen feet. Here it betrays the presence of copper quite as much as at any of the other points. In part the rock consists of quartz; and the indications of metal are increased very much by the action of the atmosphere. How much further the formation extends eastward is not known.

Few extensive ledges of granite exist here. Bowlders, large and small abound in and upon the hills, scattered and distributed with little or no order.

In form, size and color, they are of course greatly diversi-

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fied. Formerly, a large one, fourteen feet long and two feet in diameter, lay on the hill nearly southwest from the arched bridge over Ipswich River, and some forty rods from the turnpike. It was egg-shaped and almost wholly buried in the earth. This rock was worked into stones for the above bridge in 1853. It is a peculiar rock, with no other like it in the region. It may have been one of the "lost rocks" of which we sometimes hear; but as it had lain there some time and no owner called, it was worked into the bridge.

In building the railroad, on the north side of the river, an excavation was made through a hill and ledge near the bridge. Here the cut was actually carried down *through the rock*, which was found to rest on sand. It is only a mass of compacted, reddish gravel; and on exposure to the atmosphere, crumbles to dust. It seems very retentive of water, and is considerably used for grading. A hill of the like quality is found on the easterly side of the Common; and here, also, the rock rests on the sand. Hillocks and rock of the same kind occur in a pasture north of the Common, formerly belonging to the parsonage; but whether they rest on the sand is not yet known.

At the house of Mr. Small, a well was sunk eighteen or twenty feet into a ledge, and receives its water through a seam. A ledge appears on the east side of the Academy Hill, and into it a well has been sunk some eighteen feet. Green quartz was found near the bottom, but no spring; the water is supplied from seams.

There are three traditionary accounts of gold and silver having been found and mined for here.

On the eastern side of Rea's Hill is a spring, near the Danvers road. It is said that as Joseph Porter was once clearing it out, he found a lump of gold, or a stone containing that metal, worth from twenty to forty dollars. Nothing more is known of it. The ground at the place shows signs of the action of water, multitudes of bowlders being strewed in all directions around.

About fifteen rods south of the house of Ephraim Perkins, and four rods or more east of an angle in the road, is the appearance of an old excavation, now filled up and overgrown with grass. It is said that one Moses Perkins, then owning the land, mined there for silver, assisted by Buntin.

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One Smith formerly lived at a place called the "Old House Field," now owned by Silas Lake. While digging a well, he found what he supposed to be a lump of gold. One day during his absence, a strange gentleman called and requested a drink of cider, which the benevolent mistress went to the cellar to draw, leaving the stranger alone and the gold lying on the mantel. When she returned, both had unaccountably disappeared, nor were ever seen again. A mysterious circle drawn with chalk on the center of the floor where she left him, was the only vestige remaining. The obvious conclusion, with people at that day was, that the Devil had thus stolen their gold. This, of course, is tradition unsupported by other proof. The house stood easterly from Mr. Lake's, on an old way passing by the old parsonage, which stood in the "Parsonage Pasture."

Prichard's Brook is a small stream flowing from Prichard's (or Hood's) Pond. It unites with Pye Brook, and comes from Boxford, and the resulting stream continues southeasterly under various names for a considerable distance. The stream then divides; and one part, turning easterly, takes the name of Howlet's Brook, and, passing Perkin's Mill, falls into Ipswich River. The rest, known as Peabody's Brook, keeps a southerly course to what was formerly Peabody's Mill, thence, by the name of Mile Brook, to the river. Near the separation of these two streams is an ancient house, occupied by Wm. Rogers in 1737, and fifty years later by Asahel Smith, a son of Samuel Smith, Esq., Town Clerk. Of the four sons of this Asahel, viz: Samuel, Asahel, Jesse and Joseph, there are some strong reasons for supposing that Joseph was the identical "Jo. Smith" (or the father of him) who founded the sect known as Mormons.

Monday, January 21, 1861.

Meeting this evening at 7.30 o'clock, Rev. C. C. Beaman in the Chair.

Records of preceding meeting read.

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Donations announced as follows:

To the Library—from S. A. Green of Boston; George R. Curwen; Philadelphia Academy of Natural Science; American Antiquarian Society; S. Q. Felt; C. W. Swasey; C. B. Richardson of New York, N. Y.; Societe Paleontologique de Belgique, Anvers; Joseph A. Goldthwaite.

To the Cabinets—from Thomas Coleman of Boston; George A. Perkins; S. Q. Felt; Samuel R. Curwen; S. R. Phelps; N. Berry.

Letters were read from Trustees of Boston Public Library; S. F. Haven of the American Antiquarian Society; S. A. Green of Boston; Thomas Coleman of Boston.

A paper was read by Jacob Batchelder; recommending the adoption of the Decimal System in weights and measures; the manufacture of coins of an exact measure of diameter with the inscription and devices sunk into the surfaces to diminish the liability of its being worn by friction; and the establishment of a standard of weight by means of the dropping of water from a cone of specified material and proportion, at a stated velocity, temperature, barometrical pressure and moisture; such quantity of water in the form of a cube to be regarded as an unit of weight; the body, or a multiple of it, the unit of solid measure; one side of the cube, or a multiple of it, the unit of length; the square of it the unit of measure of surface, and every coin in circulation to be made of a decimal weight, measure and value.

Remarks were made by Messrs. M. G. Farmer; George D. Phippen and others, in relation to the above communication.

Adjourned.

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Monday, February 4, 1861.

Meeting this evening at 7.30 o'clock, A. C. Goodell, Jr., in the Chair.

Records of preceding meeting read.

Donations were announced as follows:

To the Library—from L. A. Huguet-Latour of Montreal, C.E.; New York State Library; Editors of High School Gazette; John H. Stone.

To the Cabinets—from James Bartlett of Wenham; Miss Hannah G. Kimball.

Letters were read from Chicago Historical Society; Trustees of New York State Library; Maine Historical Society; American Geographical and Statistical Society; Henry R. Stiles of Brooklyn, N.Y.; S. P. Fowler of Danvers.

Moses G. Farmer read an interesting paper on the combustion of coal—the amount of heat devolved from a given quantity of the different varieties under similar influences. This paper was considered a partial result of a series of experiments in process of being performed.

After some discussion, participated in by Messrs. Jacob Batchelder, the chair and others;—*voted*, that the thanks of the Institute be tendered to Mr. Farmer for his valuable communication, and that he be requested to prepare the results of his experiments for publication in the Proceedings.

H. Wheatland exhibited a piece of wood recently presented by Mrs. T. Cole, purporting to be a piece of a coffin, in which was deposited the remains of one of the victims of the witchcraft delusion, and which was dug up by the late Hon. Benj. Goodhue and Dr. Joseph Orne on Gallows Hill, on the 2d of May, 1783; also a letter from Jonathan Goodhue of

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New York (son of the above named Benjamin,) giving the particulars of the same, addressed to Ichabod Tucker, of Salem, and dated August 19, 1814.

A conversation then ensued on the subject of witchcraft, the trials, &c., which took place at Salem in 1692.

Adjourned.

Monday, February 18, 1861.

Meeting this evening at 7.30 o'clock, A. C. Goodell Jr., in the chair.

Records of the preceding meeting read.

Donations were announced from the following:

To the Library—from Henry B. Hooker of Boston; Samuel G. Drake of Boston; Samuel A. Green of Boston; Secretary of State Mass.; Canadian Institute; C. B. Richardson of New York; Boston Society of Natural History; E. M. Stone of Providence, R. I.; N. J. Lord; J. B. Alley, M. C.; Elliott Society of Natural History, Charleston, S. C.; Dorchester Antiquarian and Historical Society; W. D. Pickman; G. C. Chase; W. Brown.

To the Cabinets—from James B. King; H. M. Brooks; Miss R. E. Stickney; W. S. Roberts.

Letters were read from Massachusetts Historical Society; Wisconsin State Historical Society; Trustees of Boston Public Library; Young Men's Mercantile Library Association of Cincinnati; Franklin Bacheller of Lynn; H. R. Stiles of Brooklyn, N. Y.; A. S. Packard, jr., of Brunswick, Me.

Jacob Batchelder read a translation of a paper by M. Louis Vilmorin. It consisted of a detail of the author's experiments, undertaken for the purpose of improving the

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saccharine qualities of the Beet-Root, by selecting as seed-bearers, during several successive years, the specimens of the Beet, found to be richest in sugar. This point was determined by boring many individual beets with a metallic cylinder, and expressing the juice from the pulp thus obtained. The density of the juice, which is proportionate to the sugar it contains, was ascertained by weighing, in the different specimens, a small silver button, carefully securing uniformity of temperature and other conditions which might affect the result. By this method pursued during five years, he secured specimens of the juice which yielded twenty-one per cent. of sugar, and established the important fact of the hereditary transmission of the saccharine qualities of Beet Root.

A general conversation on subjects suggested by the above communication ensued, participated in by Messrs. J. A. Goldthwaite; G. D. Phippen; H. Wheatland; the chair and others.

Adjourned.

Monday, March 4, 1861.

Meeting this evening, A. C. Goodell, Jr., in the Chair.

Records of preceding meeting read.

Donations announced from the following:—

To the Library—from J. F. Allen; James A. Gillis; Ohio Mechanic's Institute at Cincinnati; J. Linton Waters of Chicago, Ill.; H. F. Shepard; Alfred Stone; Samuel R. Curwen; C. Allen Browne; A. G. Browne, Jr.; Franklin Bacheller of Lynn; Miss Mary R. Kimball.

To the Cabinets—from Jacob C. Hiltz; J. B. King; W. G. Webb; M. C. Martins of Bissau, W. C. A.; Charles Millett, 2d.

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Letters were read from Historical Society of Pennsylvania; Chicago Historical Society; J. Colburn of Boston; W. G. Webb; George Ropes; G. F. Flint.

Abner C. Goodell, Jr., read a memoir on the life, literary and historical labors of Alonzo Lewis, the historian of Lynn.

Henry Wheatland presented, in behalf of W. G. Webb, a specimen of Phyllium siccifolium, from the Seychelle Islands, accompanying the same with some remarks upon the habits and history of the orthopterous insects, and alluding in a general manner to the collection of Insects belonging to the Institute.

Jacob Batchelder read a paper from Vilmorin, on the Ulex Europæus.

Adjourned.

Monday, March 18, 1861.

Meeting this evening, A. C. Goodell, Jr., in the Chair.

Records of prceding meeting read.

Donations from the following announced:—

To the Library—from N. J. Holden of Lynn; G. Andrews; C. B. Richardson of New York; Fitch Poole of South Danvers; O. C. Marsh of Lockport, N. Y.; J. Kimball; W. Briggs; W. S. Roberts; Miss D. Andrews; J. Chadwick.

To the Library—from S. V. Shreve; N. Berry; J. B. King; W. G. Webb; F. Webb; W. S. Roberts.

Letters were read from New Orleans Academy of Science; W. J. Howard of Central City, K. T.

Adjourned to meet on Wednesday evening next, at the same hour.

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Wednesday, March 21, 1861.

Adjourned meeting this evening. Vice-President H. M. Brooks in the Chair.

Records of preceding meeting read.

George D. Phippen occupied the hour in giving an interesting account of Fibrilia or Flax Cotton, in connection with the Bast tissue generally, as found in trees and plants, accompanied with numerous specimens, which called forth considerable discussion from members and others present, whereby two hours of the evening were pleasantly and profitably passed by such as were fortunate enough to attend. Much information was elicited upon this important subject, which, ere long, by new appliances of inventive genius, may materially affect our peace, comfort and prosperity.

The manner of the formation of plant tissues, particularly the Bast tissues, so called, as laid on by the plastic hand of nature, was illustrated; it being deemed important to a correct understanding of the analytic and eliminating processes employed in the manufacture of fibrilia. Results prove that a careful and microscopic inspection of the manner in which the minuter fibrils of this tissue are deposited by concealed and mysterious operations within the sap vessels and around the stem, was suggestive of a course of manipulation, which, as is believed, has at last been crowned with success.

From these peculiar tissues do we derive both material for the strongest cables and stoutest canvass, as well as thread for the finest needles and muslins which vie with gossamer in texture.

This tissue, where of sufficient strength for manufacture, is found chiefly within two of the principal groups or natural orders of plants, and are designated by botanists as the Nettle and Mallows families.

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The tall nettles and wild hemp by the road sides are familiar examples of the former, and the Althea and Holly-hock of the latter.

Any person who has seen the Cotton plant in blossom, would at once associate it with the Mallows family, and not only does it furnish Cotton within its capsules, but from its stems can be manufactured a fair quality of fibrilia.

Jute of commerce, is of this order, and it is known in some parts of the world as Jews' Mallow; its leaves being cooked by that people for food.

The genus Linum, or flax, is not strictly of this family but is closely allied.

Hemp and China grass belong to the nettle group.

Fibrilia or Flax Cotton can be wrought either alone, or with wool or cotton. Various fabrics were here exhibited together with the article in the raw state and mixed with other materials both manufactured and unmanufactured.

The calico prints were very brilliantly colored, and it is well known that when made of this material they both take and retain colors better than all cotton goods. It is found also that fibrilia is the only material that can be wrought with wool, without injury to the fabric made; on the contrary, it imparts lustre, strength and durability to it.

It has been supposed by some that articles made of fibrilia would be cold in the wear; as is known to be the case with linen goods, but this quality is almost entirely overcome by the fineness of elimination to which the fibre is subjected before spinning; this is chiefly performed by a newly invented brake, which reduces the flax to the shortness and tenuity of cotton staple, after which it can be wrought upon cotton machinery. This brake, the invention of Mr. Stephen Randall, of Rhode Island, it is believed, will work as great a change in the manufacture of flax, as did the Cotton Gin of Whitney with cotton.

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The immense quantity of flax and hemp raised in our western country, was alluded to, and the cheapness with which it could be reduced to fibrilia and conveyed to the mills; much of the former being raised for seed only, while the plant containing the fibre was little better than wasted. Allusion was also made to the great variety of plants which contain this fibre, and which grow spontaneously all over the country; and among us particularly the Asclepias and Indian Hemp were cited.

Beautiful specimens of the fibre of the Asclepias, or common MilkWeed, were here shown, which were of great length and of a silvery lustre.

Here was positive proof that some of our most common weeds contain this fibre in large quantities, and without doubt a few of them would repay cultivation for this purpose, should Yankee ingenuity but continue its exertions in pursuit of a substitute for the arrogant pretensions of King Cotton.

Remarks were then offered by Messrs. A. C. Goodell, Jr.; M. G. Farmer and others. [Mr. F. spoke principally of the process of separating the fibre.]

Adjourned.

Monday, April 1, 1861.

Meeting this evening, H. M. Brooks, Vice President, in the Chair.

The usual business for the evening was suspended, in order to pay a tribute to the memory of our worthy and honored President, DANIEL APPLETON WHITE, who died at his residence in this city, on Saturday, March 30, 1861, at 2 P. M. He had been the President of the Institute from the organization in March 1848, to the time of his decease; and for the eleven years previous had held the corresponding office

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in the Essex Historical Society. He had been a liberal contributor to the funds, and also to the Library, having, at various times, presented some 4,500 volumes in the several departments of literature, the arts, and the sciences.

On motion of Mr. Goodell, it was voted, that a committee be appointed to report a series of resolutions in memory of our deceased President, at an adjournment of this meeting.

Before taking the questions, appropriate and suitable remarks were offered by Messrs. G. W. Briggs; Henry Wheatland; A. Crosby and A. C. Goodell, Jr.

The Chair appointed on this committee, Messrs. A. Huntington; A. Crosby, and A. C. Goodell, Jr.

The committee were further instructed to consider the propriety of appointing some person to prepare a memoir of our late President, for publication by the Institute.

Voted,—That when this meeting adjourn, it adjourn to the call of the committee.

Adjourned.

Monday, April 8, 1861.

An adjourned meeting was held this evening, to act upon the report of a committee appointed to prepare resolutions on the decease of their late President, the Hon. Daniel Appleton White,—and who were also authorized to invite some member to write a memoir of the departed. James Kimball, Esq., presided.

Hon. Asahel Huntington, chairman of the committee, previous to the reading of the Report, offered some very appropriate remarks, principally explanatory of some of the

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leading facts stated in said report, with a view to point out how much Judge White had been identified with the educational, benevolent and other reformatory movements in this his adopted city, for nearly half a century and more than the life of one generation. When called upon to aid in any of the objects of the day he did not enquire what others had done, but acted independently, upon his own sense of right and duty in the premises.

Mr. H. also alluded to the reforms he was instrumental in making in the probate business of this County. This subject was appropriately referred to at the previous meeting by A. C. Goodell, Esq., the present Register of Probate.

Mr. H. also described two interviews he had with Judge White during his last sickness. The first was with a friend, who was connected with Dartmouth College, and the minute and graphic account he gave of the controversy between the Trustees of Dartmouth College and President Wheelock, which occurred some forty or fifty years since, was wonderful. The Judge was appointed Chairman of the commission to arrange the matters in dispute. The second interview was on the Sunday preceding his decease. He then expressed much interest in the news of the day, and the political condition of the country awakened the fires of his patriotism, and called out his ardent prayers for the Union of these States.

Mr. H. closed his interesting remarks by reading the accompanying report:

REPORT.

It having pleased Almighty God, in the dispensations of His righteous Providence, to remove from these scenes of his long and most useful life, our distinguished and venerated fellow citizen, the HONORABLE DANIEL APPLETON WHITE, it is especially fit, that the members of the Essex Institute should take such suitable and formal action, as to mark the event, and to express upon their records, in perpetual

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remembrance, their high appreciation of the character and services of their deceased President. He was largely and most honorably identified with all the institutions of this community for nearly half a century. His whole life here has been in close alliance with whatever was adapted to illustrate and adorn our annals, or to improve and elevate the character of our people. He was one of the Trustees of the Essex Historical Society, from 1823 to 1837—its President from 1837 to its union with the Essex County Natural History Society, in 1848, under the name of the Essex Institute, of which he has been President, since the date of its organization, March 8, 1848, to the time of his lamented decease. He was largely influential in the founding and organization of the Salem Lyceum, and delivered the Introductory Lecture at the opening of that institution, of which he was the first President, and held the office from 1830 to 1833. He was in the Board of Trust of the Salem Athenæum, from 1824 to 1840, and President, from 1838 to 1840. He has served most usefully as President and Trustee of the old Savings Bank of Salem and vicinity, one of the earliest institutions of the kind in the country; and also of the Salem Dispensary. He took an active part in the formation of the Harmony Grove Cemetery, and delivered the Discourse of Consecration on a most beautiful Sunday in June, 1840, towards the close of the day; and his remains were borne and deposited there, April 2, 1861, in all the contrasts of an apparently mid winter storm, the grounds and the trees being heavily laden with the fallen, and the falling snow. Of many of these institutions he was a liberal benefactor: of this, he has been a most munificent patron, and we desire here to acknowledge and record our deep sense of obligation for his large endowments, and his never failing thoughtfulness for this, and kindred institutions. He always dispensed of his means for all good objects, with a free and open hand and heart, and *giving* became the habit and happiness of his life.

He has been one of the distinguished and marked men of the Commonwealth, since his first entrance on public life,—more than fifty years ago. He has always been eminently a *trusted* man during his whole and honorable career. He had that as the basis of his character which commanded and justified full and entire confidence in all the relations and

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duties of life. He was an eminent member of the Senate of Massachusetts for several years, during the war of 1812–1815. He was elected a member of the Congress of the United States from the Essex North District, in 1814, his residence being then in Newburyport, but did not take his seat under that election, having, in the meantime, been appointed to the office of Judge of Probate for this County, which he continued to hold with great honor and usefulness, for the period of nearly forty years. In this office, so intimately and largely connected with the interests of the entire community—bringing the incumbent into a near sympathy with the bereavements and afflictions of life—with the widow and the orphan,—how he bore himself, with what dignity, gentleness, learning, and impartiality, the whole County were the witnesses for more than a generation. He was the universally trusted magistrate—the pure and incorrupt Judge. In connection, and with the aid and co-operation of, that most excellent and model officer,—the late NATHANIEL LORD, JR., Esq., Register of Probate,—during almost the whole term of his office, both under appointment from Governor Strong, he reformed the probate practice of the Commonwealth to a large extent, and in this respect rendered a most useful as well as much needed service. His learned and excellent Treatise on Probate Jurisdiction and Practice, published a few years after of his entering on his office as Judge of Probate, inaugurated important changes in this department of the public service.

His heart and hand were always ready for every good word and work. How he moved about among us in a serene and beautiful old age, still intent on the liberal studies of his life, and still watching for any and all means of usefulness to his fellow men, beloved and venerated by the whole community, one of the last links connecting us with former generations; how deeply he was interested in all that concerned the character and dignity of his native and beloved Commonwealth; how he watched for the College, his ever honored Alma Mater, and for all Colleges and schools of good learning; how ardently he loved his country and her institutions of government, and with what a true and patriotic heart he grasped the Union and Constitution of his country in the last days of her imminent peril, we are all witnesses, and here and now desire to give and bear our united testimony.

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We shall see that benignant face, that venerable form, no more in life. The places that knew him here in visible presence, will know him no more forever. But his works and the influence of his life and character remain to us—a rich legacy to the future generations. We desire to acknowledge the hand of God in his life,—so great, so good, so beneficent a life, so full of love and blessings to his generation,—as well as in his peaceful and happy death, surrounded by all the endearments and affections of kindred and home. We would here express our hearty sympathies with his family; and to preserve this brief and imperfect memorial of our honored President and friend, and of our most distinguished fellow-citizen,--

Resolved, That the Secretary enter the same at length on the records of the Institute, and transmit an attested copy thereof to the family of the deceased.

Resolved, That Rev. Geo. W. Briggs, D. D., be appointed to prepare a sketch of the life and character of Judge White, to be published in the transactions of the Institute, and thus to accomplish more fully and adequately its purpose in these proceedings.

David Roberts, Esq., in advocating a motion for the acceptance of the Report, said:—I trust there can be but one opinion as to the propriety of accepting the Report and passing the Resolves by the members of the Institute. At the request of the Secretary, permit me to ask you to pause a while longer, before taking the vote, that I may, if possible, add some circumstances, within my personal recollections of the late Judge White, not yet particularly stated, though perhaps already alluded to elsewhere.

The deceased, while in Salem, was ever a worshipper at the First Church. There, he was constant in attendance, when health permitted, both forenoon and afternoon of the Lord's day; in this respect, resembling, as I understand, the most exemplary conduct of the late Judge Shaw. Judge White was no holiday attendant upon public worship. He did not absent himself from afternoon service. Seldom was

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his seat vacant; but in storm or sunshine usually occupied; and though generally present the whole day and himself among the oldest of all his fellow worshippers, yet, during prayer, his constant habit was to rise and continue standing.

His public spirit, too, was well known to all who have had occasion to call upon him for pecuniary aid. And when he gave, it was ever with a grace and liberality, which rendered the duty of calling upon him for such contributions not unpleasant.

Of his natural ability, high culture, love of letters and thorough scholarship, I forbear to speak. Other habits of his high character have been referred to and well illustrated here and elsewhere.

But of his opening Discourse for the Salem Lyceum, I have some recollections, which it may not be out of place to state on this occasion. That Discourse was delivered at the Church in Sewall street, Salem. The organization of the Lyceum had resulted from the proceedings of a public meeting, held at Topsfield Academy. The Resolves there proposed for discussion, I have seen, within a few years, in a hand-writing to me quite familiar. The object of the Topsfield meeting was to consider the propriety of establishing a Lyceum for the County, but resulted only in organizing one for Salem, with a code of laws, suited to the permanent existence of a Lyceum.

Judge White's Address was, at the time, deemed one of his ablest and best efforts. It was printed, and scholars, therefore, can judge for themselves of its intrinsic merits. Suffice it to say that all there considered it a fitting inauguration of the Lyceum system. If any departure has since been made in the original design; it was doubtless for wise purposes and to improve the system.

But, in conclusion, let me say that a marked character has disappeared. For several years, Judge White had retired from the busy scenes of active and official life. And

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now Death (that great leveller of all worldly and social distinctions) leaves only the grand example of the deceased for imitation. Though life be extinct, his character remains and will long be remembered; and this, with the record of his Judicial and public life, neither time nor death will erase or obliterate.

I need hardly to add that I sincerely concur in the Report and its recommendation, and trust they may be adopted without any dissent.

The Report was then unanimously adopted and the Institute adjourned.

Monday, April 15, 1861.

Meeting this evening, H. M. Brooks, Vice President, in the chair.

Records of preceding meeting read.

Donations since the meeting of the 18th of March were announced

To the Library—from Samuel A. Green of Boston; New England Historic Genealogical Society; Philadelphia Academy of Natural Science; John L. Sibley of Cambridge; Theodore Gill of Washington, D. C.; Canadian Institute at Toronto; Samuel Emery; Albert Ordway of Cambridge; D. A. White; City of Boston; Charles B. Richardson of New York; Nathaniel I. Bowditch of Brookline; G. M. Whipple; James A. Gillis; George B. Loring; N. J. Lord; Mrs. L. P. Johnson; Boston Society of Natural History; Peabody Institute at South Danvers; John L. Russell.

To the Cabinets—from Henry Felt Simon; John Burchstead of Hamilton; L. L. A. Very; William J. Chever; Nathaniel Ingersoll.

Letters were read from W. O. White of Keene, N. H.; A. Huntington.

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A committee was appointed to report a list of officers to be acted on at the Annual Meeting.

Messrs. James Kimball, George D. Phippen and Charles H. Norris were appointed on said committee.

Adjourned.

Monday, May 8, 1861.

Annual meeting this day at 3, P. M., James Upton, Vice President, in the chair.

Records of preceding meeting read.

Donations since the 15th ult. were announced from American Academy of Arts and Science; Minnesota Historical Society; J. L. Russell.

Letters were read from J. L. Russell; Minnesota Historical Society; Trustees of Boston Public Library; New England Historic-Genealogical Society; Peabody Institute, South Danvers; Henry W. Foote; J. C. Howard.

Report of the Treasurer was read and referred to the Finance Committee.

Reports of the Secretary and of the Curators, were read, accepted and ordered to be placed upon file.

From these reports we learn that eight of the resident members and four of the correspondents have died during the year; this brief notice, a deserving tribute to their memory, is appended:—

1st.—WILLIAM WILLIAMS, first son and seventh child of Samuel W. and Emily (Williams,) Williams, born at Wethersfield, Conn., Oct. 2, 1797—graduate of Yale in the class of 1816—ordained at Salem, July 5, 1821, as pastor of the

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Branch Presbyterian Church, which took the name of Howard Street, in 1827. He remained in this connection until Feb. 17, 1832, when he resigned and was afterwards in November of that year installed as the first Pastor of the Crombie Street Church—this last position he retained until his resignation in 1838. He was subsequently settled for a short time over a church in Exeter, N. H. In a few years returned to Salem, studied medicine and practiced the profession until his decease. He married his cousin, Mary Parsons, daughter of Rev. David and Harriet (Williams) Parsons, of Amherst, on the 18th of Sept. 1821. He died at Salem, after a short illness, June 17, 1860. He was widely known as a man of uncommon ability as a writer and a speaker.

2d.—Charles James Whipple, son of Henry and Harriet (King) Whipple, born at Salem, Sept. 9, 1827, graduate of our High School and a good scholar. His abilities and attention to business commanded for him a prominent situation in one of the principal Boston Banks. He died July 6, 1860.

3d.—Thomas F. Odell, son of James and Sarah (Very) Odell, born at Salem, Oct. 9, 1792—died July 7, 1860. He has been connected with us for the past few years and has always expressed a great interest in our success.

4th.—Barnard West Gardner, son of Richard and Abigail P. (West) Gardner, born at Gloucester, July 3, 1842; died at Salem, Nov. 6, 1860. A young man of great promise, and of an amiable and very pleasing disposition.

5th.—Larkin Woodberry, son of Asa and Anna (Woodberry) Woodberry, native of Beverly, resided many years in Manchester, and died at Salem, Nov. 8, 1860, aet. 65. On his removal from Manchester to Salem, a few years since, he connected himself with the Institute. His kind and polite

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attention to the members and their friends during one of our earlier field meetings in Manchester, will be long remembered with gratitude.

6th.—ALONZO LEWIS, son of Zachariah and Mary (Hudson) Lewis, born in Lynn, Aug. 28, 1794, educated at the schools in Lynn, a teacher by profession, well known as the historian of Lynn, died in the place of his nativity, Jan. 21, 1861. A memoir of him read by Mr. A. C. Goodell, at an evening meeting, has been printed in the Historical Collections, vol. 3, page 34.

7th.—JOHN SHAW SIBLEY, son of Joseph and Dorcas (Abbot) Sibley, born at Salem, June 15, 1815, died on Thursday, Feb. 21, 1861.

8th.—DANIEL APPLETON WHITE, our respected President. He was son of John and Elizabeth (Haynes) White, and was born at Methuen on the 7th of June, 1776; a graduate of Harvard in 1797, and tutor in the Latin department from 1799 to 1803. He resided for many years at Newburyport, and came to Salem in 1817, where he has since resided; died on Saturday, 29th March, 1861—an appropriate notice has been taken at a meeting held during the week after his decease, and the Rev. Dr. Briggs having consentod to prepare a memoir for publication in the doings of the society, a more extended notice is not necessary.

Of the corresponding members we may notice the death of four: three of them were natives of Salem and spent their early years in our schools, but pursuits in after life called them elsewhere.

1st.—PROF. JOSIAH GIBBS, LL.D., son of Henry and Mercy (Prescott) Gibbs, born at Salem, April 30, 1790, a graduate of Yale in the class of 1809; Tutor in Yale from

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1811 to 1815; then resided for several years at Andover, Mass., devoted to the study of Hebrew and the literature of the Bible. In 1824 he was invited to take charge of the professorship of sacred literature in the Theological department of Yale College; the duties of this he continued to discharge until failing health compelled him to retire. He died at his residence in New Haven, March 25, 1861. He held a high rank among American scholars, not only for learning and research in his special departments, but for his thorough acquaintance with general philology. He has been accustomed to devote a portion of his vacation each year for several years past, in this city, revisiting the scenes of his youth and meeting with the few of his old acquaintances that remain.

2d.—Nathaniel I. Bowditch, of Boston, son of Hon. Nathaniel and Mary (Ingersoll) Bowditch, born at Salem, Jan'y 17, 1805, graduated at Harvard in 1822, died at Brookline, April 16, 1861, a fter a long and painful illness. He is well known as a diligent antiquary, and the history and titles of the estates in Boston formed his principal study.

3d.—John B. Williams, son of Israel and Lydia (Waite) Williams, was born at Salem, Sept. 28, 1810; died at Levuka, Ovalau, Fejee Islands, June 10, 1860, where he had resided for many years, the United States Consul for those Islands.

4th.—Samuel Walker, of Roxbury, born at Cardington, England, Sept. 9, 1798, and has long resided in the vicinity of Boston. He has been one of the most active and intelligent members and officers of the Massachusetts Horticultural Society, and for some years its President. He died Dec. 11, 1860.

Publications.—Vol. 11, Part 2, of Proceedings was issued in September; also six numbers of the Historical Collections,

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containing about 50 pages each, at stated intervals during the year.

MEETINGS.—During the past summer five field meetings have been held, in Topsfield, Groveland, West Gloucester, Hamilton Ponds, and Ipswich; and ten evening meetings at the rooms, during the winter and spring.

To the LIBRARY have been added 1104 bound volumes and about 2000 pamphlets and serials, not including many incomplete files of newspapers, &c., with few exceptions, donations; and received from thirty four societies, or departments of States, and National governments, and ninety individuals. The principal donors were W. D. Pickman, Esq., who presented nearly 400 volumes of valuable books, besides many serials and pamphlets, and our late President, Hon. D. A. White, on the day preceding his decease, sent to the library some fifty volumes of choice classical works formerly owned by the late Dr. Francis Vergnies, of Newburyport, who died in that city some thirty years since, at the advanced age of 80 years,—a gentleman of fine classical attainments. In this connection it may not be inappropriate to state that the late Judge White has bequeathed his valuable library to the Institute, with some reservations to his family.

To the CABINETS, many valuable and interesting additions have been received to the various departments from 119 contributors. Of these we may mention several general collections made by our sea-faring friends and residents in other places. Among whom are Capt. Geo. Harrington, Rio Grande, Brazil; Capt. Charles Millett, 2d, Arabia and vicinity; Wm. G. Webb, Zanzibar; Capt. Francis R. Webb, during passage to and from Zanzibar; Capt. L. Peirson Ward, from Straits of Malacca; Capt. Wm. Lefavor, from Para; Capt. Wm. J. Chever, Port Louis, Mauritius, Manilla, etc.; Prof. M. Miles, Lansing, Mich.; James Bartlett

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of Wenham; B. F. Morrison of Nantucket; M. Carimundo Martins of Bissau, W. Coast of Africa; Capt. James B. King, etc.

JOHN L. RUSSELL in his Report on the Herbarium, states that the removal of the Cabinets of the Essex Institute to Plummer Hall, rendered it necessary to arrange anew the specimens belonging to each department. He says:

"The western ante-room of the lower floor, having been fitted up for the Herbarium and Microscope, and for the consultation of choice books, the part assigned to plant specimens has received what attention I could command, and has been put in working order. One entire side has received the folio sheets of dried plants, arranged as follows:—

Bundles of Azorean, Brazilian, Australian, West Indian, East Indian, Syrian Plants, gifts of various members; some of these are very choice.

A series of Swiss alpine phenogams and cryptogams.

The general Herbarium of the Institute, containing choice specimens from the illustrious OAKES, Western species from Lapham; Rhode Island species from Olney and others. Many fine specimens obtained in this vicinity at field meetings, beautiful specimens from Tracy; some of Nichols', Osgood's, &c., &c.

Incorporated and in their place are European species from vicinity of Bonn, sent me by the celebrated Caspary of the University there.

Several of the lichens, mosses and ferns are from remote parts of New England, and selected from specimens given me by Frost, or gathered by myself in New Hampshire and Vermont, or at the White Mountains.

Mt. Katahdin, in Maine, has furnished specimens by the gift of Rev. A. P. Chute and Rev. Jno. Blake.

These are all arranged on the system of Dr. John Lindley, as exhibited in his "Vegetable Kingdom," (London, 1846.) In the main they agree with Dr. Asa Gray's arrangement in his Flora of North American Plants, &c.

In drawers beneath the cases are fine specimens of rock lichens from the cullings of Oakes, in the White Mountains, and of myself in the Green Mountains, and on the lower range near Brattleboro, Vt.

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The larger slabs with patches of crustaceous lichens were from the summit of Mt. Washington, and were given me by the distinguished Tuckerman, who had the OAKESIAN lichens in his possession. All that Oakes gathered are marked with the letter O on the back.

A vast number of seeds have been collected and are enclosed in paper capsules and properly marked: it is to be hoped that all new seeds will be added from time to time. The larger seed vessels are very valuable, and are respectable for numbers.

The same should be said of sections of woods, and of resins, gums, fibres and barks used in the arts or medicine.

In conclusion, I would simply recommend that the present order be strictly observed, and if on consulting the catalogue in MSS., species should be found wanting, they be added to the herbarium, especially if procurable in Essex County.

In certain genera as in the *Asters* and *Solidago*, the suites are quite full and rich, and furnish material for more extensive and future study.

The TREASURER presents the following statement of the financial condition, for the year ending May, 1861:

GENERAL ACCOUNT.

Debits.

Athenæum Rent, 1-2 of fuel, attendance, &c.,	$457.50	
Printing 6.00, Gas Light Company 6.48,	12.48	
Express and Postages,	26.42	
Sundries,	19.01	
Historical Account,	116.66	
Natural History and Horticulture,	58.09	
Balance,	19.85	
		$710.01

Credits.

Balance of the account of 1860,	$ 84.64	
Assessments,	584.00	
Webster Bank,	35.00	
Sundries,	6.37	
		$710.01

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Historical Account.

Debits.

Books for the Library,	46.00	
Binding,	122.66	
		$168.66

Credits.

Naumkeag Bank (Dividends,)	12.00	
Michigan Central R. R. (Coupons,)	40.00	
General Account,	116.66	
		$168.66

Natural History and Horticulture Account.

Debits.

Books for Library,	18.50	
Bottles, Alcohol, and other Preservatives,	39.71	
Taxidermy,	57.88	
		$116.09

Credits.

Dividends Lowell Bleachery,	40.00	
" P. S. and P. Railroad,	18.00	
General Account,	58.09	
		$116.09

Publications.

Debits.

For Engraving Wood Cut,	9.25	
Printing,	545.95	
Balance,	35.76	
		$590.96

Credits.

Sales of Publications,	287.21	
Ladies' Fair,	303.75	
		$590.96

The Committee appointed at a meeting, March 31, 1857, to superintend the construction of the necessary Cabinets, &c., for the deposit and exhibition of all articles belonging to the

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Institute, in Plummer Hall, made a statement of their doings, containing an accurate account of the receipts and expenditures for this purpose,—the same having been done without recourse to the ordinary income of the Society :—

Credits,

By Subscription in 1857, from 74 individuals,	$2,587.50	
Net proceeds from Ladies' Fair, September, 1860,	2,043.62	
Sundries,	12.00	
		$4,643.12

Debits.

Cabinets, Removal, &c.,	$3,632.12	
Interest on Loans,	77.25	
To the Publication account,	303.75	
Deposit in Salem Savings Bank,	630.00	
		$4,643.12

The sincere thanks of the Institute are due to those generous individuals who contributed the first named sum, and also to the Ladies by whose untiring exertions, the second amount has been placed at its disposal. The Hon. R. S. Rogers, the Chairman of the committee, is entitled to our gratitude for his assiduity and zeal in aid of this object.

The following Officers were elected for the year ensuing :—

President—ASAHEL HUNTINGTON.

Vice Presidents—Of *Natural History*, Samuel P. Fowler of Danvers; of *Horticulture*, James Upton; of *History*, Henry M. Brooks.

Secretary and Treasurer—Henry Wheatland.

Librarian—John H. Stone.

Cabinet Keeper—Richard H. Wheatland.

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Finance Committee—John C. Lee, Richard S. Rogers, Henry M. Brooks, George D. Phippen, James Chamberlain.

Library Committee—Joseph G. Waters, Alpheus Crosby, David Roberts.

Publication Committee—A. C. Goodell, jr., Henry Wheatland, George D. Phippen, Ira J. Patch, John H. Stone, George M. Whipple.

Curators of Natural History—Botany—C. M. Tracy of Lynn; *Comparative Anatomy*, Henry Wheatland; *Mammalogy*, F. Winsor; *Ornithology*, F. W. Putnam; *Herpetology and Ichthyology*, Richard H. Wheatland; *Articulata and Radiata*, Caleb Cooke; *Mollusca and Paleontology*, Henry F. King; *Mineralogy*, David M. Balch; *Geology*, Henry F. Shepard.

Curators of History—Ethnology—W. S. Messervy, M. A. Stickney, Francis H. Lee. *Manuscripts*—Henry M. Brooks, Ira J. Patch, Lincoln R. Stone, G. L. Streeter, S. B. Buttrick. *Fine Arts*—Francis Peabody, J. G. Waters.

Curators of Horticulture. Fruits and Vegetables—James Upton, J. M. Ives, J. Fiske Allen, J. S. Cabot, John Bertram, George B. Loring, Richard S. Rogers, Charles F. Putnam. *Flowers*—Francis Putnan, William Mack, Benj. A. West, Charles H. Norris, George D. Glover.

Voted—That a committee be appointed to consider the expediency of holding field meetings the ensuing summer, and if concluding in the affirmative, to make all necessary arrangements for the same. Messrs. Allen W. Dodge of Hamilton, C. M. Tracy of Lynn, B. C. Putnam of Wenham, S. P. Fowler of Danvers, John M. Ives, Charles H. Norris and R. H. Wheatland of Salem, were appointed on said Committee.

Voted,—That a Committee be appointed to arrange for the evening meetings during the ensuing winter, and also

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to consider the propriety of having a course of lectures on subjects appertaining to the objects of the Institute, and if concluding in the affirmative, to make all needful arrangements for the same. Messrs. A. C. Goodell, Jr., C. C. Beaman, Jacob Batchelder, G. D. Phippen, C. H. Norris, James Kimball, F. W. Putnam were appointed on this committee.

Adjourned.

Thursday, June 18, 1861.

FIELD MEETING AT EAST BOXFORD.—This was the first of these gatherings for the present season, and was attended by a company whose numbers and apparent interest gave ground of encouragement as to the future efforts to be made in continuing these meetings. The principal party, from the seaboard towns, obtained passage by an extra train over the Essex Railroad as far as Danvers, when the Georgetown road was resorted to instead, and another short trip ended at the old and truly rural village of East Boxford. On halting at the station, rather more than a mile from the church, a goodly number of the hospitable farmers, with characteristic spirit, were present with teams to convey the party to the rendezvous, a service speedily and pleasantly performed. Near this station is the residence of the late Gen. Lowe, who was lately buried at this place with military honors.

Up to the year 1685, it appears that Boxford was a suburb of Rowley and only known as Rowley Village. In that year, however, it acquired a name and identity of its own, which it has since preserved. There is much here to entertain and instruct the rambler, more than would at first appear. The honest and thrifty people keep in activity most of the time, several saw-mills, a box and peg factory, and other manufacturing establishments; and, we are glad to

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observe, pay a commendable care to the good condition of the cemeteries of the town. In these some of the antiquaries of the company spent a share of time with much satisfaction. Among the antiquities of this village, was noticed the old parsonage. This was the residence of Rev. Elizur Holyoke, third minister in this place. This gentleman was a relative of the venerable Dr. Holyoke of Salem, was born in Boston, May 11, 1731, and graduated at Harvard in 1750. In 1759 he became pastor of the church at East Boxford and so continued till 1806, when he died. His daughter, now 87 years of age, still lives on the old homestead.

The company dividing, as usual, a party went to "Crooked Pond;" others to the woods; some to "Bald Hill;" another portion to a sunken meadow near the house of B. S. Barnes; and yet another to the old quarry. Some, in wagons ventured even further, and sought out "Carey's Ridge," finding along the rustic ways, enough of novelty and interest to compensate amply any trouble arising on account of distance.

Not long after noon, the whole company having re-assembled in the vestry of the Congregational Church, the afternoon meeting came to order at the call of Hon. Allen W. Dodge of Hamilton. After the reading of the Records by the Secretary, the following letters and donations were announced:—

Donations since the annual meeting:—

To the Library—from Connecticut Historical Society; New Jersey Historical Society; Samuel H. Congar of Newark, N. J.; American Antiquarian Society; Samuel Emery; William Mack; J. L. Sibley of Cambridge; Chas. F. Barnard of Boston; Philadelphia Academy of Natural Science; Canadian Institute at Toronto; Jonathan Perley, Jr.; Jeremiah Colburn of Boston; C. B. Richardson of New York;

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Boston Society of Natural History; Smithonian Institution; L. R. Stone; C. W. Swasey.

To the Cabinets—from Nathaniel Ingersoll; James Bartlett of Wenham; H. E. Story; Mrs. H. M. Colcord of South Danvers; James R. Phelps; S. S. Mackenzie of Topsfield.

Letters were read from the Trustees of Boston Public Library; George R. Noyes; Robert C. Winthrop of Boston; Corporation of Harvard College; G. A. Ward of New York; Tennessee State Library; Andover Theological Seminary; Josiah Quincy of Boston; Rhode Island Historical Society; American Antiquarian Society; Massachusetts Historical Society; J. Coburn of Boston; Chas. Hutchins of Boston; F. Bacheller of Lynn; J. H. Hickcox of Albany; W. O. White of Keene, N. H.; Smithonian Institution; F. Winsor; S. S. Mackenzie of Topsfield; C. M. Tracy of Lynn; Wm. Merritt; Wm. S. Coggin of Topsfield.

S. P. Fowler, of Danvers, remarked that some of our fruit trees exhibited a very unusual developement this season in their buds. This was particularly true of the Cherry, whose flower buds, as a general rule, had wholly failed, or become abortive. Whether this, and similar injuries, have been caused by late frosts, or by the premature warmth of part of the spring weather, or by some other cause, was a question of both grave and curious import. He moved that a committee be raised "to ascertain, if possible, the cause of the injury sustained by our fruit trees the past season; to note their present appearance and the extent of their injury, the best mode of restoring such injured trees, and their appearance next autumn; together with such facts in relation to the same as may come under their observation, and report at the next Annual Meeting in May, 1862." The motion being adopted, Messrs. C. M. Tracy, S. P. Fowler, James Upton, George D. Phippen, and J. M. Ives, were appointed on the Committee.

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C. M. TRACY, of Lynn, exhibited some of the specimens of plants collected by him and others during the ramble. He noticed at some length, the influence of submersion in water upon the developement of leaves; the effect, in general, being to hinder the production of parenchyma and cause the leaf to remain either deeply serrated and lobed, or else cut into teeth like a comb, and reduced to almost a mere skeleton. In illustration, such instances as the Water Ranunculus, the Mermaid Weed, and the Featherfoil, were cited. He also drew attention to the Umbelliferous Family of Plants, some members of which are poisonous, while others have aromatic and useful qualities. It is important to distinguish these readily, and one of the safest and simplest rules is, to reject all that grow in moist grounds. This is, in general a good rule, but there are a few important exceptions; as for instance, the Poison Hemlock, wholly found on high land, yet very deadly; and the Angelica, a native of the meadows, though perfectly innocent.

DR. GEORGE OSGOOD, of Danvers, enumerated the results of his botanical search and commented thereon. He cited Lady's Slipper, (*Cypripedium Acaule*) Cucumber Root, (*Medeola*) Huntsman's Cup, (*Sarracenia*) Wild Cranesbill (*Geranium*) and many others.

F. W. PUTNAM, of Salem, spoke of a few species of insects taken along the road from the station, and further, by request of the chair, as to the locomotive machinery of fishes. Though fish have nothing more than fins and tails for propulsion, yet these are used, so far as they go, precisely in imitation of the limbs of the higher animals. The mode of doing this varies; some use the fin like an oar in sculling a boat, striking square against the water; others, as the Balistes and Pipe-fish give the vertical fins a wavy motion, simulating the action of a screw propeller. Still a third class, living close on the bottom, use their pectoral fins

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for jumping, rather than swimming, and make their way by darts. Others as the Skate, fly through the water by an up and down motion of the pectoral fin. There are fishes peculiar to countries subject to drought, which, provided with reservoirs of water in the head by which the gills are kept moist and respiration preserved, will leave a parched district and travel upon their rigid fins to one more plentifully watered. Mr. P. made many statements as to Turtles, exhibiting specimens. The age of these creatures is always matter of curiosity. The external shell of a Turtle is made up of scales, and these form annual rings of growth at their edges. By counting these the age of the creature may be nearly ascertained.

Sanborn Tenney, of Newton, Lecturer on Geology at the Normal School in Salem, being invited by the Chair, expressed high gratification at the exercises he had witnessed. He had found the predominant rock in Boxford to be gneiss, passing into mica slate. He had visited the old Lime Quarry and had specimens of the crystalized Carbonate of Lime from thence; he had also been to the Sunken Meadow, so called. This, said he, is evidently a pond grown up, or grown over. The vegetation from the margin has overhung and gradually overspread the water below, till at last it has united in the middle and hidden it with a covering which might sustain the foot. Probably the water may be forty feet deep below, and the sheet of peat-moss and other solid matter is too weak to bear the weight of the twenty-five feet of gravel that have been piled on it for the railroad, and which have all gone to the bottom. A similar process of growing over has probably, in earlier ages, formed first our peat meadows, then these have changed into bituminous and then into anthracite coal, giving us the vast deposits from which we now draw our fuel.

Rev. Mr. Coggin of Boxford, expressed his pleasure at

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listening to what had been offered. He further described a noble Elm standing near the depot, not far from the shoe manufactory of Mr. Isaac Hale. This tree is the pride of the town and cannot be less than ninety years old. It measures thirteen feet and two inches round the butt, and, several feet higher, almost twelve feet round the trunk. The circumference of its shade is not far from three hundred feet, as the spreading branches reach some fifty feet from the center. An elm stands in North Andover which is of somewhat larger dimensions; but the Boxford tree is difficult to excel for symmetrical and graceful elegance.

S. P. FOWLER, of Danvers, gave an account of the jaunt to "Carey's Ridge." This was found to be a singular formation, extending, with few interruptions, from Georgetown to Gravelly Brook in Topsfield; some seven or eight miles. In many places, the steep sides go down with a sheer slope of a hundred feet, more or less, to the plain below. Remarkable pines may be seen here; one such was found to be twelve feet around the butt, the trunk being ten feet in diameter for some forty or fifty feet. Probably there is no larger pine in the county.

Mr. F. had had an opportunity of witnessing the curious "decoy" of the mother partridge to draw attention away from her young. In this case, the trick had been unavailing, as he had sought out the young bird and captured it.

At the close of his remarks Mr. Fowler offered a vote of thanks to the Proprietors of the Congregational Church, for the use of their Vestry; to the various gentlemen who had kindly pointed out the numerous objects of interest; and the citizens generally for their kind attentions to the members of the Institute this day. The vote was adopted and the meeting adjourned. It was an extremely successful one, and attended by the towns-people in considerable numbers.

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Wednesday, June 26, 1861.

FIELD MEETING AT LYNNFIELD.—The village of South Lynnfield or "Lynnfield Hotel," was chosen as the location of the second Field Meeting this season. One had been held here before, in 1848. Rather more than one hundred and twenty persons took the train from Salem and Danvers, arriving *via* South Reading Branch Railroad at about half past 10, A.M.

It is perhaps a piece of history familiar to all, that this town was part of old Lynn till July 3, 1782; when it became a "district," and remained such till Feb. 28, 1814, when it was made a town. This village is on land very nearly level, for the most part, but not far off in the woods, strong and bold ledgy eminences rise, from the top of which the rambler can here and there catch magnificent views of the surrounding country.

Several parties for exploration were here formed, as usual. One of these passed on as far as the centre village, and inspected the old serpentine quarry that is yet open there. Others strolled along the margin of Humphrey's Pond whose noble sheet of water is the just pride of this locality. It bears its name in honor of John Humphrey, of Dorchester, England, a lawyer and man of character, to whom it was granted, with some five hundred acres of land, May 6, 1635. He was a son-in-law of Thomas, Earl of Lincoln, and was chosen Deputy Governor in 1630, and Assistant in 1632. In this pond lies a lovely island of about two acres, covered with pine trees, and such growth, for the most part, encircles its margin.

A third division were guided by Gen. Josiah Newhall, through a delightful woodpath to a disused, but picturesque-looking granite quarry; and thence to one of the tall eminences spoken of, called Robin Rock. From here, a dense,

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expanding mass of forest and foliage seems to swell and undulate about one's feet, while far away, on the borders of the picture, the white buildings of South Reading, North Reading, and Wilmington, seem timidly to hover, with the highlands of Lynn in the south, and Bunker Hill with its tall shaft, standing like a beacon to guide the eye to the capital.

After the gathering in of the strollers, the meeting was organized in the Congregational Church, Rev. E. B. Willson of Salem, being called to the chair.

The record was read and the Secretary announced donations as follows:—

To the Library—from Dorchester Antiquarian and Historical Society; Samuel Blake of Dorchester; New York Mercantile Library Association; David Perkins; Solomon Lincoln of Boston.

To the Cabinets—from William O. Potter; Abraham Very; Mrs. H. M. Colcord of South Danvers; S. S. Mackenzie of Topsfield; Addison Flint of South Reading; S. Barden of Marblehead.

Letters were read from Dorchester Antiquarian and Historical Society; J. H. Hickcox of Albany; H. R. Stiles of Woodbridge, N. J.; C. Hutchins of Boston.

Mr. Willson, on taking the chair, professed himself to be no proficient in those natural powers or acquired habits by which the scientific activity of the day was stimulated and directed. He confessed an ignorance and a lack of enthusiasm in these things, unfitting him to be a meet companion of those who revelled in these deep communings with nature. He had to-day been among the rocks, but he heard no oracle; among the flowers, but they spoke no word to him. His pulses would but poorly answer to the leapings of the wild

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streamlet, and his sluggish thought caught no new inspiration from the hum of the insect's wing. Having, then, no ability to add to the knowledge or happiness of others by his own observations, he could but thank his friends that they had kindly given him a place of quietude, where his privilege would be more to hear than to impart imformation.

Rev. S. BARDEN, of Marblehead, spoke a few minutes on geological matters. He had been to the Serpentine Ledge at the Center, but with small success. The serpentine here is not ornamental in its appearance, not like the precious serpentine of Newbury. It has a dull grey color and contains a large share of magnesia. Formerly it was quarried for the manufacture of Epsom Salts. An excavation is seen in the northerly part of the town, where some deluded people at one time dug for copper. A considerable sum was spent, but nothing found save a very little copper and micaceous oxide of iron.

F. W. PUTNAM, of Salem, having come late, was provided with very little on which to speak. A large mud turtle from a pond near by, was pronounced to be a specimen of the lower order of turtles. These are very voracious, and will even attack a dog when in the water. A rare turtle (*Emys Blandingii*) had been lately given to the Institute by Mr. Addison Flint of North Reading. It was found in that town and is wholly terrestrial in its habits; living in the woods, but never in the water. A hinge across the under shell allows the creature to close the front part of his covering and thus protect the head and forefeet; not like the Box Turtle which can close up the whole. According to Agassiz' new classification, this is the only true *Emys* found in North America. One or two snakes and beetles were also spoken of.

Some remarks on the habits of the Gall Fly and Aphis

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being here made, led to a spirited discussion between Messrs. G. D. PHIPPEN, C. M. TRACY, T. ROPES, F. W. PUTNAM, and A. W. DODGE, in which many interesting observations were given as to the points in question. Mr. Putnam explained somewhat, the peculiar propagation of the aphis, showing that while several generations appeared in a single summer, only the last consisted of both sexes, and only these females laid eggs, the other generations being entirely viviparous. The classification of these insects, he said, was very tedious, almost every plant having its own peculiar sort. Mr. Phippen had watched the red Aphis of the Asters and Golden Rods, had noticed the production of living young and their distribution along the twig by this means; also the singular movements which now and then pervade a whole community, every individual jerking at the same instant and then remaining still. Mr. Tracy had noticed the curious fact, that in these gatherings of aphides, the head of the insect is invariably turned *from* the growing point of the twig, placing them as it were, head downward. If we can find no other cause for this, it may be that, as the insect seldom leaves its place, and multiplies backwardly, this position is chosen to bring the young upon the softer and tenderer parts of the bark, where, being weaker, they can feed more easily.

JOHN M. IVES, of Salem, continued these observations by speaking of the Currant Aphis. Its ravages might, he thought, be abridged by strewing air slacked lime among the currant bushes. He further alluded to the condition of the fruit trees this year, concluding that the injury was due to the remarkable alternations of heat and cold which we have had, more than to any direct agency of frost upon the buds.

In February the frost was so far gone that strawberry beds were dug over, and in March the mercury on the 3d stood

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75° in the shade and 85° in the sun. But on the 7th of March it was only 10° above 0 through the day, and on the 18th, only 4° above at sunrise. In his opinion the sudden freezing and thawing of the sap-vessels had done the injury. The fluids in plants are always in motion, according to Lindley; and Biot has, in fact, shown means for measuring the rate of motion in the sap at all seasons.

A. W. DODGE, of Hamilton, dissented somewhat from the views of Mr. Ives and favored the idea that the sap descended from the branches toward the root in winter.

C. M. TRACY, of Lynn, explained the prevalent theory of botanists, as to the course of vegetable fluids. We use the term sap rather loosely. The water and chemical solutions taken up by the roots form a very crude fluid which rises in new wood as far as the leaves, and this is one sort of sap. The sweet sap of the Maple, and the equally sweet and viscid sap of the Hickory, with the "sliver" of the Pine and other trees, is altogether another thing, elaborated by the leaves and distributed through the plant to produce its growth and increase. In winter there are no leaves and none of this sap is formed, the store of the preceding season moves slowly over the plant, however, and toward spring very rapidly. These two fluids are indifferently called sap, and this leads to misunderstanding.

Mr. DODGE continued. It was certain that the elements were taken up by the roots which nourished the growth, for the action of manures could not be otherwise explained, and hence the roots are as much nourishing organs as the leaves; indeed they are indispensable, since by them only could the plant communicate with the soil.

Mr. Tracy replied that many plants habitually flourished and matured seed with no connection with the soil. This

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large class of epiphytic plants were a living demonstration of the truth that plant-growth, in the abstract, did not require the earth for its maintenance.

Gen. JOSIAH NEWHALL, of Lynnfield, gave some interesting facts in relation to the village. It was one hundred and thirty feet above the streets of Salem, and thirty feet higher than the neighboring pond. Salem might be supplied with water to her highest attic from the clear fountain-head of Humfrey's Pond. Yet more than this might be done. Another pond lay a mile distant and within the town limits, which was some eighty feet higher than the place of meeting. Hence no house in the village need be without good water; nay, every one could have a fountain playing in its yard. Taken in connection with the admitted salubrity of the place, this fact added to the many inducements for the erection of residences here by the wealthy, who come out from the city in quest of quiet retired enjoyment.

Rev. Messrs. WHITCOMB, of Lynnfield, BARDEN, of Marblehead, and W. B. HAYDEN, of Portland, severally offered pleasant and seasonable remarks, after which, a vote of thanks was passed to the Proprietors of the Church for its use for the meeting, to Gen. Newhall and Mr. Moulton, for their service as guides, and to other citizens, for their kindness during the day.

The meeting then adjourned.

Friday, July 12, 1861.

FIELD MEETING AT KETTLE COVE, GLOUCESTER. This, the third of the series this season, was attended by a large and agreeable company, who seemed to forget, in the enjoy-

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ment of the very fine day, the disagreeable fact of two previous postponements. Although the inlet known as "Kettle Cove" is included in Manchester, yet as the entire operations of the day were conducted on the Gloucester side, the place of meeting is designated accordingly. The train having deposited its large freight of passengers at the crossing of a rustic wood-road, they speedily betook themselves to the pleasures of a ramble along its winding route till it finally brought them out at the spot of their destination.

Along the shore, in this vicinity, may be traced what is understood to be the original road from Salem to Gloucester. It shows no marks of recent travel, but remains almost wholly clear of trees, and only overgrown with grass. It may with little difficulty be traced from here to "Fresh Water Cove," several miles away. Very near the place of meeting, at the intersection of the road over which the party came and that leading to Gloucester, was formerly a public house known as the "Magnolia House," but not now kept open. The village of "Kettle Cove," properly speaking, is a little way to the west, in the town of Manchester, and the name seems to have fastened itself with great facility upon adjacent objects, a small island in the Cove bearing also the name of "Kettle Island." Most such names, in New England, at least, are thought to have a personal deriviation; and in this case, a family of the name of Kettle are known to have lived near by before 1650. Probably others of the same name preceded them, as the island was so called in 1634.

A stroll along the shore in this vicinity brings to view many curious, as well as pleasant things. Just on the east of Kettle Cove and only separated from it by a narrow headland, is found a smaller indentation called Knowlton's Cove. Here, by the agency of some peculiar currents, or singular

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cleavage in the neighboring rock, or perhaps many other causes combining, the thousands of bowlders on the beach are rolled and worn by the surf till every one, almost, is rounded and smooth as an egg. Indeed, so white is the granite from which they are made and so remarkable their form and the manner in which they lie clustered together in the little nook, that an observer, looking for the first time from the ledge above, might easily fancy that he saw the nest of some monstrous bird, filled with eggs fit to rival those of the Roc of Sinbad. Many of these have been carried away for curiosities.

Passing on over the stern granite shore to the eastward, a large rock a short distance from the shore, and connected with it by a sunken reef, bears the name of "Norman's Woe." A tradition exists that a man named Norman was shipwrecked here; but history has no further confirmation of it, than that Richard Norman, some time before 1682, sailed on a voyage and never returned. Beyond the Woe, the visitor looks with admiration down an immense chasm or crack, caused by the disintegration and removal of a huge greenstone dyke, which has thus left in the granite what is termed "Rafe's Cleft." It is one of the most remarkable of the rents, or "purgatories" which abound on our shores and are, no doubt, due to the same cause.

Some of the company explored the above spots, and others resorted to the Magnolia Swamp, a mile or so away, the praises of which have been often dwelt upon. Others, in small parties, sought out whatever else in the vicinity proved to possess interest and attractiveness. About 2, P.M., the whole assembled in a shady bit of woods near by, and the formal meeting was opened, Mr. S. P. Fowler of Danvers, Vice President, in the Chair.

The Records of the preceding meeting read, and donations were announced from the following:

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To the Library—from Jeremiah Colburn of Boston; F. Bacheller of Lynn; Charles F. Barnard of Boston; David Perkins; Henry F. Shepard; Mrs. B. Wheatland; C. Foote; George C. Chase; Philadelphia Academy of Natural Science; Maryland Historical Society; C. B. Richardson of New York; Mrs. E. Barnard.

To the Cabinets—from Joseph G. Waters; Mark Lowd; James M. Estes; James R. Phelps; G. J. P. Floyd of Topsfield; George H. Devereux; John G. Felt; R. H. Wheatland; C. L. Peirson.

Letters read from Maine Historical Society; Corporation of Dartmouth College; Trustees of Newburyport Public Library; C. J. P. Floyd of Topsfield; J. Colburn of Boston; J. H. Hickcox of Albany, N. Y.; Nathaniel Ingersoll; F. Bacheller of Lynn; Henry R. Stiles of Woodbridge, N.J.; R. A. Fisher of New Haven; S. P. Fowler of Danvers; Corporation of Bowdoin College.

The Chair, in opening, said there were some matters of curious interest to be noted in regard to the place of to-day's meeting. This section of the shore, from Kettle Cove on the west to Fresh Water Cove on the east, and for a limited, though rather uncertain distance inland, was marked as if with some terrible malediction. The pasturage is good, the land fertile, the air salubrious. Man enjoys himself here, his horses and his poultry, his household animals, all seem to thrive. The birds of the air and the fish in the sea are undisturbed, but the poor cow, the ox and the sheep, are cursed as with the finger of death. They cannot live here. The hay grows bright and fair on these fields; it is sold and carried away to feed such animals, and no harm is known to arise; but one of these fated creatures cannot be kept on these lands more than a few months at most, and often but a few weeks. The breadth of Kettle Cove divides this blighted spot from a better; the sickening kine on this side may look and low across to their kindred, grazing in sight

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on the other, in sleek and unbroken health. Some hundred acres are known to be thus stricken; and for more than a century the Knowltons and their ancestors, proprietors here, have suffered and wondered at this infliction of nature. No observation or experiment has yet revealed the cause; the mystery remains a mystery still.

On a motion to that effect, Messrs. C. M. Tracy of Lynn, A. W. Dodge of Hamilton, James Bartlett of Wenham, and Henry F. King of Salem, were made a committee to investigate this curious subject and report the results to the Institute.

James J. H. Gregory, of Marblehead, described the geological features of our coast region, and particularly dwelt upon the remarkable dykes of greenstone which almost everywhere appear, cutting the granite or sienite at all sorts of angles. In this vicinity the prevalent rock is nearly a true granite, and is a very useful building stone. Westward, the greenstone type predominates, and the rock, though worse for walls, is much better for macadamizing. This hill, where we stand, is no doubt a vast pile of bowlders and loose fragments, coated with a soil, comparatively thin, formed from the decomposition of the rocks in part, with an addition of accumulated vegetable matter. But few notable minerals are found here; even the iron does not, probably, form over two per cent. of the mass of the rock, but this is quite enough to affect the compass-needle perceptibly.

Rev. C. C. Beaman of Salem, had visited "Rafes Cleft" and the other remarkable spots in the vicinity, and had been charmed with the beauty of the scenery he had fallen among. He could congratulate the Institute on their good fortune in meeting here; and he could also congratulate the people of Gloucester that the natural and historical features of the place had received such fitting and satisfactory notice in the recent history of the place by Mr. Babson.

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GEORGE D. PHIPPEN, of Salem, had heard the question asked during the day, whether this region possessed any special interest in its history; and he had heard a negative reply given. But the fact was otherwise. No one should forget that the first settlement on the proper soil of Massachusetts was near this spot, a little toward Cape Ann. The region, from that little colony toward Naumkeag or North River, was thought very beautiful by the early voyagers. Gosnold thus spoke of it in 1602; and the redoubtable Capt. John Smith, a dozen years afterwards, declared that "Cape Ann Side," as it was long called, was "the paradise of all these parts." When Higginson came here with his few followers, and also when the Arabella arrived with the honored lady whose name she bore, the passengers described the perfume that came from this shore "like the smell of a garden." They said, also, that here they landed and picked "plenty of strawberries, gooseberries, and sweet single-roses." We have been regaled with some such to-day.

The natural as well as the civil history of this district, has its points of interest. They have attracted the attention of the curious and scientific for years, even from the time of Jocelyn's mythical lions and monstrous frogs, to the present day, notorious with the fame of the Sea Serpent. And if to pass hence to the subject of plants be not too abrupt, we all know that no other spot in New England shares with this the glory of producing the *Magnolia Glauca*. And here, as the lovers of the beautiful have seen to day, is a special haunt of the *Kalmia* or Mountain Laurel, a truly American plant, and worthy to be adopted as a national emblem by us, as the "Fleur de lis" has been by France. Or, looking to somewhat humbler forms, the same great order of Heaths to which the *Kalmia* belongs, furnishes many other species to represent it in this vicinity; and all are plants of special beauty. Thus, although there is no true heath in the western world, we have abundantly before us the remarkable

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beauty that characterizes the family to which it gives its name.

F. W. PUTNAM of Salem, being asked what was the opinion of Agassiz as to the Sea Serpent, stated that the great naturalist had often remarked to him that "there was no reason why there should *not* be a Sea Serpent, but as yet he knew of no sufficient proof that there was one." Rafinesque, a half century ago, named and described from the accounts given by sailors and others, several genera and species of Sea Serpents.

A committee of the New-England Linnæan Society made a report which was printed forty or fifty years since, upon a specimen, as it was claimed, of this wonderful creature. But that specimen was, doubtless, nothing but a mal-formed black snake.

Mr. Putnam remarked upon the kinds of insects collected by him during the day, stating that such as are found along the sea shore always differ materially from those proper to the interior. He further spoke of the difference of the animals of the land and the ocean, saying that in the ocean while we find nearly all classes represented, they are generally the lower orders of the class, and also species that attain the greatest bulk; thus in the higher class, that of mammalia, we find its giants, the Whales, only in the ocean, and these are of the lowest order of the true mammals.

In the class of Birds, the lowest, or the Sea-Birds, are also of large size, having but few equals on land. In the Reptiles this is reversed, as we find that what have generally been held as the highest order, the Chelonians, are represented by the large Sea-Turtles; while the lowest true Reptiles, the Snakes, are terrestrial. Among the class of Batrachians there are no marine representatives known. In the class of Fishes, the Sharks and Skates exceed all others in bulk, and

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are confined to the ocean, though they are in many respects more highly organized than the other fishes; again, the lowest of all fishes, the Lancelet and the Mixine, are purely marine animals. Among the Articulates the class of Crustaceans is to a great extent oceanic, and the larger species are strictly so. Most of the large worms are inhabitants of the salt water; and even among the Insects there are many species that live on the sea-shore, on the Sea-weed, &c. The greater number of the Mollusks are also marine, and the whole class of Cephalopods (Squids, &c.,) in which we find the giants of the branch, are strictly so. Among the Radiates there are few, such as the fresh water Bryoza, that are found away from salt water. The difference noticed between the animals of the ocean, the fresh waters, and the land, is, as a general thing, so well marked, that we can almost always assume that the oceanic representatives of a group are the lowest, the fresh-water ones being higher and the terrestrial the most highly organized.

C. M. Tracy of Lynn, had spent most of the forenoon in the Magnolia Swamp. There are species of plants in that spot not generally to be met with. Not only is the Magnolia there, but also a beautiful white fringed Orchis; the pretty *Clintonia;* the Inkberry, a species of Holly, and one of the finest evergreens we have; the brilliant and charming Sundew; with others of commendable beauty. He would like to make careful search through that swamp, for it would hardly fail to reveal many botanical treasures.

The thanks of the Institute were then voted to the Messrs. Bartlett of Wenham and the Messrs. Knowlton of Kettle Cove, for their kind attentions during the day, and the Intitute adjourned.

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Thursday, August 6, 1861.

FIELD MEETING AT LYNN.—This meeting was held at the Gravesend Village, and had been appointed for Wednesday of the week previous, but postponed on account of important public events. The company having mostly arrived in the morning train from Salem, and alighted at the Central Station, proceeded to the rendezvous on foot through the tract known as "Rocks Pasture," and under the direction of Mr. W. W. Lummus. No especial haste was made in this walk; and some halts were made to visit High Rock, and the other elevated spots, and pleasant locations, with which this territory is so well supplied. Arriving at the Gravesend School House, a temporary stay was had, and then a division into small parties for further explorations. One detachment, led by Mr. H. S. Lufkin, made a tour among the meadows and copses in the vicinity, in search of the varied botanical riches there found, and these had much pleasure and encouraging success.

A second division resorted to the shore of the Flax Pond, near by; and found much satisfaction in the examination of the surroundings of this fine old sheet of water. Others took various jaunts among the neighboring hills and woods in quest of geological and other objects of interest, of which no small share are to be met with in this region.

The afternoon meeting was organized in the school house at about 3 P.M., when in the absence of both President and Vice President, George D. Phippen of Salem, was called to the chair.

Records of the preceding meeting read.

Donations were announced as follows:

To the Library—from Mrs. A. Nichols; Miss M. Ward; R. H. Wheatland; Trustees of the New York State Library;

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C. B. Richardson of New York; N. Bouton of Concord, N.H.; Zoologishen Gesellschaft der Frankfurt; A. P. Howard of Boston.

To the Cabinets—from S. V. Shreve; Mrs. J. F. Deypeyster of New York.

Letters were read from the Trustees of Boston Public Library; Corporation of Yale College; C. M. Tracy of Lynn; L. Agassiz of Cambridge; A. P. Howard of Boston; Mrs. Frances G. Deypeyster of New York; D. C. Gilman of New Haven Conn.; C. M. Endicott; M. A. Stickney.

The Chair, in introducing the exercises, made some statements explanatory of the principles, objects and history of the Institute, and of the purposes and method of these "Field Meetings." We had pursued this system of gatherings for several years, and thus far, with signal advantage and enjoyment to all who participated. At these meetings we bring together those who feel an interest in the works of Nature and who make them their especial study; and we place them face to face with the various phenomena of creation, as they are exhibited in our fields, our hills, and our forests. By these excursions, we are relieved from the necessity of studying these things in the dry, dead cabinets of home; and the student who walks with us has a view of them as Nature has herself arranged them, drawing his conclusions from facts undisguised by the interference of man, and free from that partial and imperfect character which will ever be detected, even in the best ordered and fullest collection. Such students of nature are with us today; may we hear from them how they have fared in these respects during the day's rambles.

James J. H. Gregory of Marblehead, said that this region presents many interesting matters to the eye of the geologist. In this immediate vicinity, the rock in place is uniformly porphyritic, and the porphyry takes on a great variety of texture, color and marking; so that a long and pleasant

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course of study might be made upon this rock alone. The State Map does not notice the porphyry of this vicinity, or only feebly indicates it. This is certainly a grave defect, and ought to be amended; for the rock is too rare and striking in its characters to be overlooked in such a work. Greenstone is found not far from here, but it is somewhat different from that of Marblehead, being of a rather slaty character.

Mr. Tracy, of this place, has thrown out the suggestion that the type of vegetation in a given territory is directly affected by the nature of the rock formations there found. He had no doubt but this idea was based on fact. He had to-day made a short excursion of a mile and a half, or so, to look at some of the curious exhibitions of drift to be seen among these hills. In this ramble he had seen for himself that a difference could be detected in the forest growth along either side of the line of junction between the porphyry and the granite. No doubt a closer study would set this matter in a clearer light; it is certainly a point deserving of careful attention. He had been to-day among bowlders of every size, from small pebbles to a small house, for some of them were at least one hundred and twenty feet in circumference and thirty feet high. And yet these great blocks are not left with sharp angles, but in almost all cases are rounded and finished off like beach-stones. Undoubtedly they have all been moved, and belong to the great mass of the drift formation. In the deep woods near the South Danvers line, he had been piloted by Mr. Tracy to find what he could never could have found alone—the somewhat noted and very remarkable "Phæton Rock." A more curiously situated rock would be hard to find, or to conceive of. A vast block shaped like half a pear with the flat side undermost, some ten or fifteen feet in greatest length, lies precisely balanced, and firmly sustained on four small rounded stones twelve or fifteen inches in diameter, just on the brink of a precipice, over which its smaller end projects for almost half the length

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of the entire block. We can never sufficiently admire the means, stupendous as they must have been, and yet magnificently simple, by which such a mass has been thrust out from its parent bed and deposited in a position so strange, and we may almost say, magical.

The mineralogist is not favored in this region like his geological brother. So far as ascertained, the list of species is small and the kinds not specially remarkable. He had been asked whether rocks grow. The question may be variously answered. In some cases, rocks certainly *grow smaller* if the expression be allowable. The wind and frost--all the elements—are wearing down the granite about us and the figure of the ledges becomes much altered by this cause. Rocks whose structure depends on the agency of heat can have no increase of bulk afterward; but such as limestone, sandstone, bog iron ore, and chalk, the products of mere accretion and pressure, may be all the time in process of formation, or, as we might say, of growth.

The distribution of shells is always interesting to the geologist, bearing, as it does, on the subject of fossil remains. An exploration of the islands in Salem Harbor affords some curious results, in the peculiar distribution of the genus *Helix*. On House Island, near the Misery, are found several species, some of them in abundance. Eagle Island also furnishes many specimens, but they differ materially from those of the first locality. *Helix albolabris*, *H. alternata and H. hortensis* are the principal kinds found at these places.

C. M. Tracy of Lynn, said that although the list of minerals found here was not large, yet some of them did not lack importance. One of the first, if not the very first, establishments for the working of iron in this country was at Saugus, and was supplied, as is believed, with bog iron ore from the northern part of the town. Again, just east of the place of meeting, lies the celebrated Lynn Mineral

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Spring, whose waters, almost turbid with some ferruginous matter, redden the stones they run over, and will throw down clouds of solid matter by standing in a bottle for a few days. This is a true chalybeate water, and may acquire its properties by the decomposition of iron pyrites.

THE CHAIR observed that from the rocks we may readily turn our attention to the vegetation that covers and adorns them. Many fine species may be detected in this region; some of them have come to our notice to-day. The fragrant White Alder, (*Clethra*), the Dogbane, (*Apocynum*), and the various Milkweeds, (*Asclepias*), are all plants of beauty and deep interest. A species of the latter, the Common Milkweed (*A. Cornuti*) has a fibre of great strength and delicacy, resembling that of Flax. A lady of Salem made extensive experiments on this material a few years since, and succeeded in manufacturing it into various textile fabrics of much excellence. In approaching damp lands, or, as here to-day, large ponds, we find the vegetation always more or less modified, and new forms appearing. Such plants as the Monkey Flower, (*Mimulus*) and the various species of Orchis were then usually met with, as we have found to-day.

C. M. TRACY said that the Orchis Family, alluded to by the Chair, is a very remarkable one, as well as very extensive. Among its multitudinous species, two entirely diverse modes of growth are observed. The European and North American forms follow the usual style, and sustain themselves in the soil by means of ordinary roots. Some of the tropical kinds do the same; but very many are without roots, or have them transformed into organs for holding, by which they attach themselves to rocks, trees, &c., and these grow with no connection whatever with the earth. They are not mere exceptions, but form a great division of the family, which is thus distinguished into Terrestial and Epiphytic species. The *Lobelias* are all plants of much interest

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to the botanist. Our Cardinal Flower is the only really beautiful one we have, but the West Indian species are, many of them, perfectly gorgeous. The *Clethra*, which has been alluded to, is one of the great family of the Heaths, and almost the latest one, with us, to open its odorous blossoms. It is a pretty shrub for the garden, growing and flowering well. The Dogbane also mentioned is a close relative of the popular Oleander. Its family are all possessed of active properties and some are violent poisons. Here we may note the fact, that a simple feature marks every member of this family, as the botanists often finds to be the case elsewhere. Every one of these plants has the stigma, or top of the pistil, shaped just like a little spool, and this simple trait is not found in any other family. He further spoke of the Ground Nut, (*Apios*) the Thoroughwort and Everlasting, with several of the Nightshades. The Potato is only a cultivated Nightshade producing tubers; and these tubers are not roots, as some think, but buds upon underground suckers, swollen and gorged with nutritious matter. A specimen was shown with the tubers growing above ground. Mr. T. having also spoken of the fact that the common Red Clover has sometimes heads of a clear white. The Chair corroborated the observation and added some remarks on changes of color in our native flowers.

JAMES E. OLIVER of Lynn said he had found these bleached Clover-heads and the Thistle now and then exhibited similar changes. What is the real nature of this phenomenon? Can we call it a freak of nature, or is it something produced under a regular chain of causes, and reducible by experiment and investigation? And if there exist laws for the change of color in flowers, may there not be such for change of species in the plants themselves? In fine, what is the true solution of the vexed question of the origin of species? Plainly such changes may be very easy and gradual, or they

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may be rather sudden—by leaps, as it were; but which, may be rather hard to decide.

Mr. TRACY said that when plants with colored flowers produce pale or white varieties, these are almost inevitably weaker in constitution. This is confirmed by the fact that there is hardly a pure white flower known. What we call such are all attenuated shades of other colors. And we also find that white flowers produced by art, always tend to revert to their normal tint. *Verbena Melindres* is red; and all the white sorts produced from it are liable to redden in certain cases. So of the *Geranium*, &c.

The CHAIR said these changes are no doubt producible by art; but a long period must be necessary to effect the result, and after all, retrogradation would certainly take place at the first opportunity. Nature is inevitable in her rules and laws. Our fathers gathered just such plants and flowers as we; and when we interfere with the natural course, the current sets back strongly toward its source. Double varieties are always difficult to keep, always "running out" as we say.

This topic was much further discussed by Messrs. GREGORY, OLIVER, TRACY, T. ROPES of Salem and others.

Rev. C. C. BEAMAN of Salem said, he noticed that some of the company had to-day brought their sketch-books and made drawings of the beautiful things around them. He wished this were oftener done. It would be a delightful exercise, and better opportunities could not be had.

Mr. DAVID N. JOHNSON of Lynn, had experienced much satisfaction during the day's exercises, and added some remarks on the variety of talent which such occasions tended to bring together.

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On motion of Mr. BEAMAN it was Voted, That the thanks of the Institute be presented to the School Committee of Lynn for their kindness in furnishing the use of this building for this meeting; to Mr. L. W. Crossman, the teacher of this school for his friendly interest in our behalf; also to Messrs. W. W. Lummus, H. S. Lufkin, Oliver Ramsdell and other residents in this village, for their attentions and services, as guides and otherwise.

Adjourned.

Thursday, Aug. 29, 1861.

FIELD MEETING AT MIDDLETON. Most of those who attended this meeting, came as usual by the morning train from Salem; but others of the more active collectors of natural objects preferred an earlier trip by the carriage road and came accordingly, making such stops for their investigations as seemed to be proper, or promised to be productive. This party made some considerable progress in dredging the brooks and sweeping the bushes, for reptiles, shells, or insects as the case might be; while fishing after the more established mode was not by any means neglected; but failed to afford any notable results.

On the arrival of the main party the scene of action was transferred, for the most part, to the shores of the fine pond which bears the name of the town which claims and protects it. The usual diversity of taste here found exhibition and employment, as this company lounged in the pleasant picnic grove that adorns the shore, or that one proceeded slowly along by the water, carefully searching after some unexpected plant, or another manned the jaunty sail-boat there kept, and pleased themselves with an excursion more thoroughly aquatic still. There were not wanting those who sought for berries; and the geological characters of the

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place were well scrutinized by those who seldom neglect a fair opportunity.

The refreshments of the day were served in rustic style in the grove, after which, resorting to the Town Hall, the afternoon exercises were opened, Vice President S. P. Fowler in the chair.

Records of preceding meeting read and donations from the following were announced:

To the Library—from Mrs. Andrew Nichols; Department of the Interior; John B. Alley, M.C.; John Robinson; George F. Read; Zoologische Gesellschaft, Frankfort, A.M.; American Philosophical Society.

To the Cabinets—from W. S. Daland; C. H. Norris; George Goldthwaite; Samuel Preston; Israel T. Howe; Joshua P. Haskell of Marblehead; J. J. Rider.

Letters were read from E. Everett of Boston; Trustees of Newburyport Public Library; Department of the Interior; D. F. Weinland, Frankfort, A.M.; C. M. Tracy of Lynn.

In his opening remarks, the Chair took occasion once more to urge on those present the importance of preserving the local and civil history of our community by the preservation of all documents, regarded, perhaps, as worthless, while still possessed of intrinsic value. Of this nature, all old wills, contracts, depositions, records and books of account, may be mentioned as worthy of prime regard. Likewise all old books; the older and more marked by the pens or pencils of the former owners, the better; and every pamphlet, newspaper and old letter; all should be carefully saved, for no one knows how much there may be in one or other of them for the good of those who are to come after us. It is the business and pleasure of the Essex Institute to be the treas-

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urer of these relics; all that need be done is, to send to their Secretary any and all such contributions, and the three-fold advantage is gained, of pleasing them, of benefiting posterity, and clearing one's own house of what might unsuitably encumber it. Let all remember these things, and let no document go to destruction, however insignificant it may be in your own eyes.

JAMES J. H. GREGORY, of Marblehead, had examined the place pretty thoroughly for geological features worth mentioning here. He had found only two ledges of out-cropping rock in the town, and this was a very peculiar circumstance. Not many places in New England could say the same; we generally are marked, all over the country, by bare and craggy projecting rocks of one sort or another, often in great profusion. Undoubtedly, rock might be found under all this gravel, as in other places; but at present, the drift lies undisturbed and conceals them. There seems to be great variety in the character of this drift; around the pond were many of the different types of granite and forty of them might be collected within an hour. He had procured a good specimen of sienitic granite; also a piece of pure sienite, from which the feldspar had been washed out, leaving curious, irregular markings and cavities. These ribbed and worn fragments are rather common along the ancient water-courses of New England, and indeed there is nothing very peculiar in any the formations about here. The chief point of interest is, after all, the abundance and quietude of the overlying drift, so covering and hiding all the ledges that only two of them anywhere appear.

C. M. TRACY of Lynn, had noticed some plants about the pond worthy of note, and some still more striking had been found by others. The Pipewort, (*Eriocaulon*) whose globular, lead-colored heads are so conspicuous along muddy

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shores, is a kind of intermediate form of vegetation, having much of the sedge about it and not a little of the character of a moss. It is however, a true flowering plant. The little Creeping Spearwort (*Ranunculus*) is almost the smallest of the Buttercup family, but though its leaf is no broader than a grain of wheat; and its blossoms as small as a sparrow's eye, yet its petals bear the beautiful lustrous gloss in full perfection, that so marks each and every species of Ranunculus. The shrubby Potentilla is, generally, more common about peat bogs, and in its time of flowering makes quite an ornamental appearance, for although a simple Five-finger, it has a pretty, compact habit, and claims more beauty for its form than otherwise. Beside these, a fortunate explorer had to-day detected a splendid clump of the Cardinal Flower, (*Lobelia*) whose always inimitable scarlet had sported into the most coquettish dashes of red upon a ground of the purest white. A few of these variegated Lobelias have been found from time to time about the country, but it is doubtful if any more beautiful have come to light than Middleton has furnished us to day. Those other plants, whose intrinsic charms are a little veiled by their common occurrence, are as readily found here as elsewhere. We have to-day the Aster, just beginning its season of bloom; the Andromeda, akin to the Blueberries, but with dry and fleshless fruit; the Balsam, with its curiously fashioned flowers hung all over it, like golden horns-of-plenty; the Thoroughwort, of sterling medicinal value, in which Middleton seems privileged for a full share; the fragrant Ground-nut (*Apios*); the aromatic Sassafras; the deadly Cicuta; the pretentious Trumpet weed, eight feet high; and a score of others all worth some notice at a proper moment.

Dr. George Osgood, of Danvers, continued the same subject, and added to the interests of the plants themselves a yet stronger interest arising from the untiring devotion to

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his favorite study, seen in this botanist of almost eighty years. To-day he had met with a species, which he exhibited, the like of which he had not found for many years.

F. W. PUTNAM, of Salem, proceeded to describe most of the zoological specimens taken during the day. He also, by the help of the blackboard, explained the four divisions, or branches, of the animal kingdom; showing how the radiated structure characterizes the Star-fishes, Jelly-fishes, and Polyps, or coral animals, hence called Radiates; how the character of concentration is stamped on all animals belonging to the branch of Mollusca, of which the Clam, Snail, and Squid are common examples; whereas, in the branch to which the Insects, Crabs and Worms belong, articulation, or a division of the body into segments, added to an equal arrangement of parts on each side of the longitudinal axis, and a tendency to an outward display, are the principal characteristics; this branch is called Articulata; while in the fourth branch, that of Vertebrata; formed of the Fishes, Reptiles, Birds and Mammals, including Man; the body is divided by a longitudinal axis, the back-bone, into an upper and lower arch; the upper containing the brain and spinal chord, while in the lower are situated the organs of vegetative life.

In reply to questions, Mr. P. said what we call the locust is quite another insect. The oriental Locust is only a species of what we call a Grasshopper; while our Locust ought, instead, to be called the Harvest Fly. Again, the real Grasshoppers are small green insects, quite different from those that have borrowed this name. The noise produced by these creatures is not at all vocal, but made by a brisk, fiddling movement of the rough hind leg across a part of the wing-cover. Further, Mr. P. stated, that the whales now on exhibition at the Aquarial Garden, Boston, were genuine specimens of a small species known to naturalists as the *Beluga*; and were very well worth an examination.

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THE CHAIR said that this season we had been visited, in our fields, with what all of us had often heard of, but many had never seen. This was the dreaded army worm. He had specimens of the worm and its cocoons on the table, and had been somewhat careful in observing its habits. It had been known in this country two or three times before, but only at long intervals. This might be the last time it could be observed by any now living, and it would be well to improve the opportunity, and put on record what we might of its character and history.

On motion the following were appointed a committee to collect all available facts on the above subject and report at the Annual meeting of the Institute :—Messrs. F. W. Putnam and Henry Wheatland of Salem, and S. P. Fowler of Danvers.

Rev. WARREN BURTON, of Middleton, offered some remarks expressive of his high gratification at the proceedings of the day. He cordially approved the purposes and plans of the Institute; and while he wished them full success, was always glad when they sought that success in this quarter of the county.

DAVID STILES, Jr., of Middleton, made some statements of a local character, bearing chiefly on the history of the town and certain of its prominent families. He further assured the Institute of the hearty welcome they might ever expect on visiting this town, and his own hope that such visits might be often had and enjoyed.

The thanks of the Institute were then voted to Messrs. Stiles, Esty, Graves, and others, whose kind attentions so much enhanced the comforts of the day; to the Selectmen, for the use of the Town Hall for this meeting; and the citizens of Middleton generally for their friendly interest in our prosperity; after which the meeting adjourned.

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Friday, November 15, 1861.

Meeting this evening, at the rooms in Plummer Hall, the President, Asahel Huntington in the chair.

The record of the preceding meeting read.

Donations were announced from the following:

To the Library—from H. K. Oliver, a large collection of books and pamphlets, including many valuable musical works; from C. B. Richardson of New York; L. M. Boltwood of Amherst; A. H. Quint of Jamaica Plain; Boston Society of Natural History; Canadian Institute at Toronto; John L. Sibley of Cambridge; Chas. T. Brooks of Newport; Montreal Society of Natural History; C. K. Whipple of Boston; J. F. Worcester.

To the Cabinets—from Joseph Short of Philadelphia; J. W. Libbey; Chas. Hoffman; Edward D. Ropes; Mrs. Thos. S. Greenwood of Ipswich; Willard A. Ashby; S. P. Richardson; Stillman Barden of Rockport; John B. Ashby; Richard S. Rogers; Geo. L. Neal; W. H. A. Putnam; Museum of Comparative Zoology at Cambridge.

Letters were read, from Massachusetts Historical Society; Trustees of Boston Public Library; Edward D. Ropes; Charles Hatch; A. B. Almon; and N. T. True of Bethel, Maine.

It was announced that a portion of the books bequeathed by the late Judge White, had been deposited in the Library, that the remainder would be received in a few days, and that, at a future time, a report concerning the same would be presented.

A. C. Goodell, Chairman of the Committee on Evening Meetings, reported progress on the subject committed to their care, and on his motion it was voted that the next meeting be held on the first Monday in December.

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Henry M. Brooks, of the Curators on the Historical Department, read a circular which he had prepared, requesting the friends of the Institute and others to collect any matter that may serve to illustrate the cause, origin and progress of the present war; and, on his motion, it was voted that the same be printed and distributed under the direction of the curators.

A large collection of specimens in Natural History were placed upon the table, the same having been recently received. F. W. Putnam made a few remarks upon these specimens, and stated that there were on the table 262 different species, and over 400 specimens of animals, and that at least 200 of these species were new to the Institute's collection, this being a much larger number of species than it was often the good fortune of any Society to obtain at one time.

The collection received of Mr. E. D. Ropes, of Zanzibar, is of great value to science, and will add much to the usefulness of the Institute's collection. There are several new and undescribed *genera* and *species* of Fishes in this collection, and many that are very rare and interesting—in all, 54 species of *Fishes*, 7 species of *Birds*, 4 species of *Reptiles*, 30 species of *Mollusks*, 33 species of *Crustaceans*, and 39 species of *Radiates*, making 167 species of alcoholic specimens. Many of the *Radiates* and *Crustaceans* are undescribed. In addition to these there are three bottles containing *Insects* in alcohol that have not yet been arranged, and a large number of dried specimens of *Corals* and *Sponges*, that will be reported upon at a future meeting. Besides the specimens retained at the Institute, quite a large number of duplicates have been sent to the Museum of Comparative Zoology at Cambridge, in exchange for species not in the possession of the Institute. Mr. Putnam desired to take this opportunity of calling the attention of members

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to the importance of collecting large numbers of every species; duplicates are in reality as valuable to the Institute as unique specimens, for the purpose of exchange. On motion of Mr. Putnam the thanks of the Institute were unanimously voted to Mr. Ropes, for the valuable and interesting collection of specimens of Natural History announced this evening. Mr. Putnam, alluding to the other specimens on the table, said that they consisted of a collection of 66 species of *Reptiles*, *Fishes*, *Crustaceans*, *Mollusks* and *Radiates* from Hong Kong, China, presented by Capt. W. H. A. Putnam, nearly all of which are new to the Institute's collection and some of them are undescribed. A collection of 9 species of *Holconotes*, (viviparous fishes) from San Francisco, and 13 species of *Cyprinoids*, (Shiners, &c.,) from Europe and the western portion of America, have been received from the Museum of Comparative Zoology, consisting of types or original specimens of species described by Prof. Agassiz, Mr. Agassiz, and himself; also, specimens of a Blennioid fish from Cape Palmas, Africa, presented by Dr. George A. Perkins, and a few of the fishes presented some time since by Capt. Charles Millet, from the Arabian Gulf.

Mr. Putnam called upon the members to report any facts which they might obtain relating to the army worm, as every thing bearing upon the habits and history of this insect is eagerly sought after by entomologists, and stated that he had learned from Mr. Packard, a student in the Museum of Comparative Zoology, who is engaged in preparing a paper upon this subject, that no less than seven species of parasites of the worm had been discovered.

After a short discussion on the army worm and the canker worm, in which several members participated, the meeting adjourned.

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Monday, December 2, 1861.

Meeting this evening, at Creamer Hall, A. Huntington, President of the Society, in the chair. After calling the meeting to order, he offered few remarks in which the distinctive character of these meetings were alluded to, and expressed the hope that they would be instrumental in diffusing much general information respecting the various subjects here presented. In alluding to the historical labors of people of our county, he referred to a work recently published, giving a genealogical and historical account of the Reed family, by a member of the Essex Bar, living in Groveland, which contains a large amount of valuable information obtained by great labor and research.

The records of the preceding meeting were then read by the Secretary, after which Mr. A. C. Goodell, from a Committee appointed for the purpose, submitted a report, which was accepted, respecting the regular evening meetiugs for the present season. The first and third Monday evenings of each month have been selected for the meetings, which will commence at half past seven o'clock. Creamer Hall has been designated as the place of meeting, and a general invitation is extended to all ladies and gentlemen interested in the objects of the Essex Institute, to attend. The order of exercises at the meetings will be as follows :—Reading of the records of the preceding meeting and remarks upon the same; Reports of Committees; Transaction of Business; Reading of Communications and Correspondence; Announcement of Donations; Election of Members; Adjournment.

Mr. F. W. Putnam continued his report from the last meeting, on the collection made by Mr. E. D. Ropes, at Zanzibar. He stated that the bottles on the table contained about sixty species of insects, many of which are new. This is the first collection of any number of alcoholic insects that

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has been presented to the Institute. They have been named so far as it was possible by Mr. Shurtleff, a student in the Museum at Cambridge. He showed several species of Star fishes, Sea Urchins and Corals from Mr. Ropes, and a fine *Cidaris* from Wm. G. Webb, and announced a donation of 25 species of fossil and recent *Echini* from the Museum of Comparative Zoology at Cambridge. He alluded to the different classes of Radiate animals, showing the difference between the several classes and orders, and made a few remarks upon the formation of Coral reefs, &c.

Letters were read from Smithonian Institution; State Historical Society of Wisconsin; W. O. White; J. K. Wiggin of Boston; Department of the Interior; Chs. Ward. The letter from the last named person, gave an account of several specimens of bark which were uniformly and smoothly rounded by the action of water falling upon them in "pot holes" formed in the rocks, at the base of Great Falls, in the town of Hiram, Oxford County, Maine; also some general observations concerning the beauty and sublimity of these falls at the various seasons, and the pleasant journey for travellers in that direction.

Donations received since the last evening meeting, were announced as follows:—

To the Library—John C. Lee; B. W. Stone; Tenney & Co., of Boston; Secretary of State's Office; Charles F. Williams; Jacob Batchelder; H. M. Brooks; Allen W. Dodge; George C. Chase; N. T. True of Bethel, Maine.

To the Cabinets—Francis M. Ricker; H. K. Bryant; H. E. Story of Belleville, Ill.; C. F. Williams; Mrs. D. A. White; Museum of Comparative Zoology, at Cambridge; Henry O. White.

Mr. F. W. Putnam stated that Mr. S. H. Scudder of the Museum of Comparative Zoology, was engaged in preparing a monograph of the Orthoptera of New England, and wished

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to procure specimens of Grasshoppers, Locusts, Crickets, native Cockroaches, Earwigs, &c., from different localities, during the coming season; and called upon the members and others interested to collect specimens for Mr. Scudder, stating that it was a very important investigation, and bearing much upon the Agricultural interests of the County.

Mr. Putnam laid a prospectus of a work upon the order of snakes by Prof. Jan, of Milan, before the meeting; and after stating the importance and the plan of the work he moved that the Library Committee be requested to consider the expediency of subscribing for the same.

On motion of Mr. A. C. Goodell, it was voted that, when the meeting adjourn, it be to meet at Creamer Hall, on Monday evening, Dec. 16. The meeting then adjourned.

Monday, December 16, 1861.

Meeting this evening. A. Huntington, President, in the chair.

Records of preceding meeting read.

A letter was read from H. W. S. Cleveland, in response to the circular recently issued by the Curators of the Historical Department, proffering to the Society files of several newspapers kept and being kept during the present national troubles. On motion of Rev. Mr. Beaman, the offer of Mr. Cleveland was accepted, with the thanks of the society. Letters were also announced from J. B. Colt of Hartford, Conn.; A. B. Johnson of Utica, N. Y.; New York Mercantile Library Association; New Jersey Historical Society; Massachusetts Historical Society; Samuel Blake of Dorchester; J. W. Harris of Cambridge; S. P. Fowler of Danvers.

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The principal part of the evening was occupied in the reading of a paper by Mr. Samuel P. Fowler of Danvers, on Cotton Mather. The following abstract of the same is here appended.

After the excitement in 1692, caused by the Salem Witchcraft, had subsided, and the government had made some restitution to those persons or their families who had suffered by the delusion, Dr. Cotton Mather turned his attention, amongst other subjects, to the quiet and peaceful study of the natural productions of New England. Our knowledge of his researches in nature was obtained by reading the London Philosophical Transactions, Vol. 29, for the years 1714, 1715, and 1716. The letters composing the articles in this journal were prepared and sent by Dr. Mather to Dr. Woodward and Mr. Waller of London, for examination before publication. Upon the receipt of Mather's letters, the Secretaries of the Society found them to be a strange mixture of incredible occurrences, totally unfit for a Philosophical journal. They accordingly refused to publish several of them, and gave but short extracts from others.

The first letter, under date of Boston, Nov. 17, 1712, was addressed to Dr. Woodward, in which Dr. Mather brought forward in a way peculiar to himself, his Biblia Americana, now lying neglected in the possession of the Massachusetts Historical Society, no man as yet having been found who would venture to publish this ponderous manuscript in two volumes folio.* The concealing from his friend, Dr. Woodward, the author of this work, and recommending it to some generous *Macaenas*, (the patron of the ancient poets,) is highly characteristic of Dr. Cotton Mather. In order to enlist Dr. Woodward in the publication of the Biblia Americana, Mather speaks of its containing large philosophical remarks taken out of Natural Historians, and gave him a specimen of the work in a note on Genesis, chap. 6, verse 4, relating to giants seen in the days of Noah; and as proof that they once existed, relates the finding of bones in Albany, New England, seventeen feet long, which he supposed to be hu-

*We examined the Biblia Americana, and found it to consist of six parts in folio, with its pages crowded with the small handwriting of Mather, and apparently prepared for publication.

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man thigh bones, and a tooth discovered four fingers broad, which he thought to be the eye-tooth of a man! Dr. Woodward comments in a doubtful way upon these supposed human remains by saying: "It were to be wished that the writer had given an *exact figure* of these teeth and bones," which had it been done, the learned Secretary would probably have at once discovered that they belonged to some large animal, such for instance, as the Mastodon.*

The second letter describes a few plants to be found in New England, with a promise to furnish more.

In the third letter Dr. Mather gives us an account of the wild turkey seen in New England, some of them weighing sixty pounds, but says they are poor meat, being tough and hard. This as an ornithologist we should pronounce a tough story. Audubon says, a fair estimate of the ordinary weight of a wild turkey is from fifteen to eighteen pounds. He saw one in Louisville market that weighed thirty-six pounds. Bonaparte says, "I have ascertained the existence of some weighing forty pounds, and all the relations above this weight he considers fabulous."† Dr. Mather's notion that wild pigeons migrate to the moon, must be classed with those who suppose that swallows go into the mud in Autumn!

The fourth letter, on antipathies and the force of imagination, is amusing and characteristic of its author.

The fifth letter relates to monstrous births, but is summarily dismissed by Dr. Woodward as nothing remarkable.

The sixth letter relates to persons receiving medical aid from dreams. This is rejected and refused publications, with the remark, these accounts relate but little to "natural philosophy."

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*It is now well understood that the giants he referred to, were distinguished for their great wickedness and not their large stature.

†Thomas Morton in his New English Canaan, written in 1632, when speaking of turkeys as seen at his residence in Braintree, says: "at divers times in great flocks have they sallied by our doores; and then a gunne (being commonly called in a readiness) salutes them with such a courtesie as makes them take a turn in the Cooke roome. Of these have been killed, that have weighed forty-eight pounds apeece. They are many degrees sweeter than the tame turkies of England, feede them how you can." It is said the wild turkey is still to be found on the Holyoke range of mountains in Massachusetts. It will be noticed that Morton's weight of the largest turkey he saw in 1632, exceeded by eight pounds, the one noticed by Buonaparte. All writers with the exception of Mather, attest to the good eating qualities of this bird. It is possible Dr. Mather eat his wild turkey out of season during the summer, at some of the councils at Salem village, held for the purpose of settling Mr. Parris's difficulties, or at the dinner given him by John Hathorne, Esq., of Salem, at the execution of George Burroughs at Gallows Hill. It would not be surprising if he thought his dinner upon that day, whether turkey or pig, was hard and tough!

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The seventh and last letter to Dr. Woodward, composing this series, relates to cures deemed mortal. This was rejected by the Secretary as containing but little philosophical information.

The first letter sent by Dr. Mather to Mr. Waller, gives an account of the Indians, and is interesting. It also furnishes a method discovered by him, for finding the Julian Period.

The evening glade* is mentioned as being constantly observed in February, and first noticed by Dr. Childrey, adding the cause of that appearance must be sought for above the atmosphere.

The second letter relates to rainbows and mock suns.

The third letter has a relation of a savage murder discovered by a dream, reminding the reader of the strange stories related in the Magnalia. This letter is at once dismissed by Mr. Waller, with the quiet remark, "as this does not directly relate to natural philosophy the particulars are omitted."

The fourth letter gives an account of the Rattlesnake, and the wonderful effect of its bite upon the edge of a broad axe, causing the part bitten to break out, leaving a gap! As this letter relates particularly to Natural History, it is published in full in the transactions.

The fifth letter informs us of the effects produced by thunder and lightning, earthquakes, hail storms, and tornadoes. Hail stones it is said, are sometimes formed five times larger than hens' eggs, and lie upon the ground to the depth of three or four feet! The effects of violent whirlwinds or tornadoes are noticed, and the sad ruin produced sometimes in winter by the ice loading the trees and causing their limbs to break under its weight. Mention is made of some ancient works, or remains, above the hideous falls of the Merrimack.

In the sixth letter Dr. Mather gives us an account of the famous Dighton rock, accompanied with a figure, which is now known to be very inaccurate. This is one of the earliest notices of this interesting picture rock.

The seventh and last letter to Mr. Waller relates to the longevity and fruitfulness of New England. Dr. Mather in this letter gives us several instances of persons living about him who had arrived to the age of one hundred years. One

*This is the luminous tract, known as the Zodiacal light seen in the evening after twilight.

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Clement Weaver lived to one hundred and ten years, his wife being one hundred years old. This man to the last year of his life, could carry a bushel of wheat to the mill, the distance being above two miles. Dr. Mather remarks, "I do not find by any of these relations, that the persons observed any regularity or method in their manner of diet, exercise, or the like." In regard to the fruitfulness of New England, he says, in the letter, it is no rare thing to have an aged gentlewoman see many more than one hundred of her offspring. He mentions "one woman that had twenty-three children, of which nineteen lived to man's estate. Another had twenty-seven; another twenty six, of which twenty-one were sons, one whereof was Sir William Phipps; another had thirty-nine children."

It is well known that Cotton Mather and his father Dr. Increase Mather were very desirous of writing the natural history of New England, but neither of them possessed the qualities of mind necessary for a natural historian, nor would they have been willing to spend the time requisite to an examination of our natural productions. Cotton Mather probably never saw the skin of a fox, except in a furrier's shop of some of his parishioners, at the North End, in Boston.

Rev. C. C. Beaman offered a few remarks in defence of Mather, thinking he was actuated by a pure desire to diffuse information, being a pioneer in this newly settled country. He said the clergymen of New England were the first to introduce the cultivation of flowers, probably obtaining the idea in England. In many places on Cape Cod this was particularly the case, and at Eastham there are the relics of a very ancient garden called the Minister's Garden, and it is well known that the celebrated Rev. Dr. Griffin, wherever he went, carried with him a taste for horticulture, and in his writings there are frequent allusions to the study of nature. In visiting West Gloucester, a year or two since, on the occasion of one of the Field Meetings of the Essex Institute, his attention was directed to the remains of an old garden laid out by a former minister of the place, who died

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about the year 1800. The interest of the clergy in objects of this kind is even indicated in the lines of Goldsmith :—

> "Near yonder copse, *where once the garden smiled*,
> And still where many a garden flower grows wild,—
> There, *where a few torn shrubs* the place disclose,
> The village preacher's modest mansion rose."

Mr. A. C. Goodell followed, taking the general ground that it was a rare instance where a man had gained so extensive a reputation upon so small an amount of genuine merit, as Cotton Mather had succeeded in doing. He was of the opinion that Mather strove to obtain a name among men, and continued his remarks to some length, citing facts to prove this position, (and alluding to Mather's connection with the witchcraft delusion of 1692,) not offering them, however, as of general application to the clergy, from the fact of Mather's connection with the Ministry, although it might be remembered that not only was Goldsmith's preacher, who had been quoted, devoted to the beautiful in nature, but

> "Far other aims, his heart had learned to prize,
> More skilled to raise the wretched *than to rise.*"

Some little discussion followed, Mr. Beaman remarking that, while it was quite likely Mather may have committed some errors, we cannot rob him of his reputation, although we can excuse his faults when we consider the state of society of that period. Give him his due, he said; let us honor those who were the early pioneers, so far as we can.

The Chair said that witchcraft was recognized by our laws as a crime, and was tried and punished as a crime by our Courts. It was recognized throughout the world; and, under these circumstances, it, at least, was not just to hold Mather accountable for that generally diffused sentiment, though he might be one of its victims. He had an agency, no doubt in carrying forward these prosecutions, as he was a leading person in his day.

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The Institute then adjourned, the donations since the last meeting having been previously announced as follows:—

To the Library—from Geo. R. Curwen; Canadian Institute at Toronto; C. B. Richardson of N. Y.; J. B. Felt; A. B. Johnson, Utica, N. Y.; Philadelphia Academy of Natural Science; Boston Society of Natural History; John B. Alley, M. C.; Geo. C. Chase; Geo. Choate; G. B. Loring.

To the Cabinets—from Miss S. A. Chever; Miss Rebecca Johnson of Cohasset; Mrs. F. M. Creamer; Forrest River Lead Company; Arthur Hodges; John Robinson.

Monday, January 6, 1862.

Meeting this evening at Creamer Hall. The President, Asahel Huntington, in the chair.

The records of the preceding meeting were read.

Letters were announced from Charles E. Brown of Providence, R. I.; M. Miles of Lansing, Mich.; New York Mercantile Library Association; Trustees of Boston Public Library; John Robinson.

Among the articles which had been forwarded to the society was a specimen of the fifteen cent paper currency of the Southern Confederacy picked up at Beaufort, and a sheet of unsigned military orders of various denominations issued by the Board of Supervisors, County of Winnebago, Illinois, on the war fund appropriated for the relief of volunteers. Also some unginned cotton from Port Royal, and specimens of the stones of the Washington well, near Annapolis.

A. C. Goodell, occupied the evening by reading an interesting paper on Thomas Maule, and his times. [See Historical Collections of the Institute, vol. iii, page 238.] During the reading, Mr. Goodell presented to the Institute, in behalf of Mr. James B. Curwen, a pencil drawing of the old

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house built by Maule, which formerly stood on the spot now occupied by the residences of the Messrs. Curwen, on Essex Street. It was the house for many years owned and occupied by the late Deacon Samuel Holman. He also exhibited to the meeting a collection of thirteen old mourning rings belonging to a family of Salem, and kindly loaned for the occasion.

Donations received since the last meeting, were announced as follows :—

To the Library—from the Massachusetts Historical Society ; N. Y. Mercantile Library Association ; Essex Agricultural Society ; C. K. Whipple of Boston ; H. M. Brooks ; Geo. C. Chase ; Philadelphia Academy of Natural Science ; Jacob W. Reed of Groveland ; John Robinson ; Mrs. N. D. Cole ; Caleb Foote.

To the Cabinets—from Joshua Cleaves ; Stephen F. Hathaway ; Wm. Crandall ; W. G. Welch ; Mrs. H. M. Colcord of South Danvers ; Brown E. Shaw ; Mrs. James Chamberlain ; Charles Davis of Beverly ; Wm. Hulin of Rockford, Illinois.

Mr. F. W. Putnam made a few remarks upon a can of fish, and reptiles brought from the East Indies, by Capt. Wm. Crandall. Among them were two specimens of the East India python ; and in this connection he spoke of the different species of this snake, as found in South America, Africa and India.

The Institute then adjourned.

Monday, January 20, 1862.

Meeting this evening, the President, Asahel Huntington in the chair.

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Records of the preceding meetings were read.

Letters were read from A. B. Almon; Thomas H. Johnson; S. H. Brooks.

Rev. C. C. Beaman read an interesting paper, being a historical sketch of the Howard street Church in Salem, with brief notices of the several ministers who have successively officiated in that place.

Remarks were offered by Messrs. T. Ropes; J. B. Felt; A. C. Goodell jr., and the Chairman, suggested by the above paper and containing many interesting reminiscences of the founders of the church and some of their cotemporaries. Mr. Goodell moved that a vote of thanks be tendered to Mr. Beaman for his interesting and valuable contribution to the ecclesiastical history of the city, and that a copy of the same be placed at the disposal of the Committee on Publications to be inserted in the Historical Collections. (See Historical Collections of the Institute, vol. iii, page 272.)

Donations since the last meeting were announced as follows:—

To the Library—from the Directors of the Lowell City Library; Vermont Historical Society; American Academy of Arts and Sciences; A. B. Almon; C. B. Richardson of New York; Directors of Newburyport Public Library; Ariel L. Cummings of Roxbury; Wm. Mansfield; John Robinson; Henry M. Brooks; Geo. C. Chase; John H. Stone.

To the Cabinets—from C. H. Fifield; S. H. Brooks; H. M. Brooks; E. E. Chever; Thomas H. Johnson.

Adjourned.

Monday, February 3, 1862

Meeting this evening, A. Huntington, President in the chair.

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Records of preceding meeting read.

Letters were read from Wm. Hulin of Rockford, Ill.; and Wm. Gray Brooks of Boston.

F. W. Putnam read the following communication from A. E. Verrill of the Museum of Comparative Zoology at Cambridge:—

Notice of a Primnoa from St. George's Bank.

BY A. E. VERRILL.

A specimen of coral now in the collection of the Essex Institute has been submitted to me for examination, by Mr. F. W. Putnam.

This was taken in one hundred fathoms of water, on St. George's Bank, and presented by C. H. Fifield to the society, Jan. 13th, 1862. It proves to be a genuine coral belonging to the genus *Primnoa*, very much resembling and probably identical with *Primnoa lepadifera* of the northern seas of Europe. From the latter however it seems to differ somewhat in the more irregular branching and in the form of the calcareous scales of the polyp cells, but these differences are slight and may be merely peculiar to this specimen. In order to ascertain its true specific characters we need additional specimens, and particularly some preserved in alcohol with the polyp cells perfect.

The specimen consists of several large branching stalks, some of them upwards of two feet high, and an inch in diameter, attached to a stone by large calcareous bases. Part of the polyp cells still remain on the branches, although they adhere but slightly when dry. The branches consist of alternate concentric layers of calcareous and horn-like deposits; the calcareous substance predominating at the base of the stalks, while the smallest branches are almost entirely composed of the horn-like matter. In this respect it differs from the true *Gorgoniæ*, for among them the axis is entirely horn-like. In many species of the genus *Plexaurea* there is a large proportion of Carbonate of Lime in the basal portion of the axis, while the upper parts are

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horny. In the genera *Gorgonella Verrucella* and several others the axis is entirely calcareous, as it is in the well known Red Coral (*Corallium.*) In *Isis*, *Mopsea*, and other related genera it consists of alternate joints or segments of calcareous and horn-like deposits. From these facts it is evident that the character of having a calcareous or horn-like axis is not of so great importance as some naturalists have supposed. Thus Dr. J. E. Gray, has divided the *Gorgonidæ* into two sub-orders,* viz:—*Lithophyta* characterized as having a continuous or jointed *calcareous axis* and *Ceratophyta* having a *horny* one. Into the first he puts *Primnoa*, which, as I have shown, is *partly horny*, and into the second, *Plexaurea*, which is *partly calcareous.* It is therefore evident that such groups are quite artificial. He also has a third suborder called *Sarcophyta*, which corresponds very nearly to the family of *Alcyonidæ* of Dana and Milne Edwards. In this group, if we exclude *Briareum*, which should go with the *Gorgonidæ*, there is no solid axis and the whole mass is composed of tubular polyp cells united in various ways in the different genera. This group is evidently of higher value than the two other divisions mentioned, and should be placed on a level with *Gorgonidæ* and *Pennatulidæ*, as has been done by both Milne Edwards and Dana. But these three groups, *Alcyonidæ*, *Gorgonidæ* and *Pennatulidæ*, present gradations of structural characters which entitle them to be ranked as *suborders*, rather than as families of the order, *Alcyonaria.*

This order as far as yet known is represented on the northern coast of New England, only by *Alcyonium carneum*, Agassiz† and the *Primnoa* now under consideration. A species of *Leptogorgia* is found in Long Island Sound, while farther south the representatives of the order become very numerous.

The only specimen of *Primnoa* known to have been previously found on our coast was presented to the Boston Society of Natural History, in Nov. 1860.‡ It was taken in

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* On the arrangement of Zoophytes with Pinnated Tentacles, by Dr. J. E. Gray, Annals and Magazine of Natural History, 3d series, vol. 4, p. 439.

†On the structure of the Halcyonoid Polypi. By Louis Agassiz. Proceedings of the American Association for the Advancement of Science, 1850.

‡Proceedings of the Boston Society of Natural History, Vol. 7, p. 418.

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eighty fathoms of water, in the Bay of Fundy, thirty miles southeast from Mt. Desert, and although somewhat larger, is not so perfect a specimen.

This is a highly interesting addition to our marine fauna, and it is desirable that additional specimens should be obtained.

The European species is said to grow to an immense size, sometimes even fifty or sixty feet high; but these accounts are probably somewhat exaggerated.

Mr. Putnam presented the casts of a head of a Flat-head Indian and Hottentot, from the Museum of Comparative Zoology at Cambridge. He then made a few remarks upon the geographical distribution of animals, and pointed out the limitation of the Faunæ, with particular reference to that of New England.

The Chairman, Mr. Huntington, then stated that it might not be generally known to the meeting that during the present week, there would occur an interesting anniversary, namely, that of the ordination of the first missionaries to foreign parts, which took place at the Tabernacle church, in this city, February 6, 1812. He stated that as the son of the Rev. Dr. Samuel Worcester, who took a prominent part in the ceremonies and services of that occasion was present, he might say something of interest in reference to the subject.

Rev. Dr. Samuel M. Worcester then replied, giving a brief but interesting notice of some of the prominent leaders in the missionary enterprise, and speaking of the immense amount of good that had been accomplished by the movement, not merely in an evangelical point of view, but in reference, also, to philosophy and science.

The following donations received since the last meeting were then announced:

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To the Library—from American Antiquarian Society; Wm. P. Tucker of Bowdoin College; E. E. Chever; Boston Society of Natural History; S. A. Lord of South Danvers; Mass. Legislature; Henry M. Brooks.

To the Cabinets—from John C. Chadwick; Wm. Hulin of Rockford, Illinois; E. E. Chever; Geo. F. Austin; C. H. Norris; A. C. Goodell, Jr.; Samuel F. Nichols; Mrs. F. M. Creamer.

Adjourned.

Monday, February, 17, 1862.

Meeting this evening, A. Huntington, President, in the chair.

In the absence of the Secretary, Mr. George D. Phippen was chosen Secretary, pro tem.

Records of preceding meeting read.

A letter was read from Sanborn Tenney, Esq., of Cambridge, relative to the delivery of a course of lectures in Salem, under the auspices of the Essex Institute, on the subject of Geology; which was referred to the appropriate Committee.

Rev. C. C. Beaman read a paper giving a geographical outline of Cape Cod, its discovery, the Indians resident upon it, its adaptation to their wants, sustenance from shell and other fish, deer and other game, geese and ducks, nuts, plums and berries, and the convenience of fresh water in ponds and springs, and of salt water in creeks, coves, bays and small inlets, passing to a description of the simple and happy life led by its original inhabitants before the white man came. The settlement by the whites was briefly narrated—the arrival from England in 1639, of the minister Lothrop, with a portion of his church, to take up their abode

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in Cummaquid, now Barnstable ; of Rev. William Loveridge, with a number of families at Monomet (Sandwich,) and organizing a church in 1640 ; of Mr. Matthews at Yarmouth with others, nearly at the same time ; and Gov. Prince with a part of the Pilgrim church at Nauset (Eastham) in 1644.

The progress of the Cape in improvements, the social and hospitable character of its inhabitants, the number of ship-masters, their skill, education and integrity were portrayed The fisheries and farming, the beauty of the villages, the distinguished merchants and professional men born in this region, and achieving for themselves honorable distinction in our great cities, and the importance of this portion of our territory for the harbors on Massachusetts Bay, and for raising up seamen to enrich the nation in peace and protect it in war, came under consideration.

Rev. Joseph B. Felt followed with remarks upon the aboriginal inhabitants of the Cape, and the remarkable distemper that had, a few years previous to its settlement, nearly depopulated the region round about, resembling, in many respects, the yellow fever. He also alluded to the idolatry of the Indians and of the difficulty that the missionary Elliot had to contend with on that acconnt.

Rev. S. M. Worcester, who had been invited to prepare a paper upon the early founders of the American Foreign Missionary Society, declined to do so, saying that the subject had been already thoroughly prepared, and that any questions that might arise would be fully answered by consulting the pages of a book which he now presented to the Institute, just published (1862,) in Boston—"The Memorial Volume of the First Fifty Years of the American Board of Commissioners for Foreign Missions." He remarked that John Elliot derived a large portion of encouragement and pecuniary support from the contributions of christian friends at home in England. He also spoke of the avowed

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idolatry of the Indians, of which there is abundant proof, but which has been often overlooked or misstated by writers upon the character of the Indians.

A. C. Goodell, Esq., and Rev. Mr. Felt, continued a discussion of the paper read by Rev. Mr. Beaman, more particularly in relation to the early pirates that infested these shores, such as Capt. Kidd and John Quelch, and of the thorough manner in which the Earl of Bellamont suppressed this nefarious outlawry.

After a vote of thanks for the paper which had afforded so much information, the President concluded the discussion of the evening by remarks tending to clear the skirts of Massachusetts from the implication of interest or connivance with the buccaneers. He also alluded to prominent men who first saw the light of day on that barren Cape, if barren it could be considered while so fruitful in the sterling patriotism of its sons.

Adjourned.

Monday, March 10, 1862

Meeting this evening, A. Huntington, President, in the chair.

Records of preceding meeting read.

A. E. Verrill, of the Museum of Comparative Zoology at Cambridge, being introduced to the meeting, spoke of the structure of corals and of the polyps producing them, and gave a history of our knowledge of them.

The class of polyps is now divided by naturalists into two principal groups or orders. The first of these orders, called *Actinoid Polyps* or *Zoantharia*, may be distinguished by having a varying number of *simple cylindrical tentacles*. The number varies from twelve to several hundred, but is almost

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always some multiple of six. These tentacles increase in number by the introduction of new ones between those first formed, in a very regular way and according to very beautiful laws. The common Sea Anemones, or Actinias, belong to this order, but they never produce corals. Those kinds, by which the corals that are porous and consist of limestone, are formed, resemble the Actinias very much, but deposit limy matter in their sides and internal membranes and only the upper parts of their bodies and their tentacles remain soft and flexible. The coral itself is a complete internal skeleton of the polyp that forms it.

These polyps may be very minute or they may be several inches or even a foot in diameter. Some, like the Fungia, remain always simple and free, but others adhere to rocks or other solid substances. Other kinds develop buds upon their sides or other parts, and these buds soon become perfect individuals, but generally remain connected with the parent polyps so as to form clumps or masses. The star-corals (*Astrea*) and the common branching corals (*Madrepora*) are formed in this way. Again, some species, when they have reached a certain size, begin to widen and finally divide in the centre, so as to form two distinct individuals with two mouths, two stomachs and two sets of tentacles, from what was before one individual. In some cases the separation remains incomplete, and the polyps are united in long series. Corals of this kind generally form large solid masses and are among the most important of the reef-building species. The common Brain Coral (*Meandrina*) is a good example of this kind.

The next order, called *Halcyonoid Polyps or Alcyonaria*, have always *eight* tentacles and these are always *compound* or lobed along the sides. These also may be soft and produce no coral or they may form corals, but never such ones as are produced by the Actinoids. Some of them produce solid calcareous corals without pores or cells, but such corals serve merely as a support for the polyps which are situated in a soft external crust and secrete the solid coral from their inner membranes. The well known *Red Coral* is formed in this way. Other kinds, such as the Gorgoniæ or "Sea Fans" and "Sea Plumes" form solid interior corals resembling horn, and are generally dark colored, but the crust that covers them and in which the polyps are situated is gener-

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ally friable and brilliantly colored, so that these kinds of corals often resemble bright colored sea weeds. The curious red coral called *Tubipora* belongs to this order, and also the singular "Sea Pens" (*Pennatula*) and the strange *Renilla* found on our southern coast, and many other allied forms.

The red coral used for ornaments, (*Corallium rubrum*) seems to have been known in very ancient times, but the first naturalist who mentioned it was Theophrates a disciple of Aristotle. By him it was thought to be a mineral substance formed in some unknown manner at the bottom of the sea. Ovid alludes to them as plants that are soft while in the water, but hard when dry. Pliny also considered them as plants, and mentioned several other kind, among them *Gorgonia* and *Antipathes*. From the time of Pliny there was but little advance in the study of corals until the sixteenth century, when they were studied by the leading botanists of that period. Lobel in 1576 gave figures of six species found in the Mediterranean. In 1605 Clusius figured and described among the marine plants, several foreign species of corals. Several other botanists of this period added others to the species already known. The works of Ferrate Imperato published at Naples were very important. Rumphius during a long residence in Amboina, studied the corals of that island and made excellent drawings of them, but his great work (Herbarium Amboinense) was not published until after his death, in 1705. He had previously, in 1684, expressed some doubts in regard to the vegetable nature of the corals, and spoke of their relation to Actinias and starfishes, but he gave no proof of their animal nature, and his views passed unnoticed. In the beginning of the eighteenth century the corals were universally considered as plants, and placed among the plants without flowers. The first naturalist who studied corals in the living state, was Boccone, but he failed to perceive their true nature, though he ascertained many important facts. He learned that it was covered when living in the sea with a soft crust, but that the coral itself was hard. He opposed the idea of their vegetable nature but considered them mineral concretions. His work was published in 1671. Marsilli in 1707 announced the discovery of the *flowers* of the coral, but Shaw in 1727 considered the polyps that he had observed on their surface, as roots.

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Reaumer in 1727 wrote a treatise on corals, in which he considered them as plants and opposed the ideas of an observer, whose name he withheld, that they were animals. This observer was Peysonnel who first studied corals on the coast of Barbary, and afterwards at the island of Guadaloupe, He made many very careful experiments on the coral polyps in a living state, and in a paper communicated to the Royal Society of London, in 1751. he fully established their animal nature and showed their relation to the Actinias, which had long been considered as animals. This paper, however, was never published entire. Reaumer became finally convinced that he was right, but considered that the hard corals were built by the polyps, as bees build their cells ;—an idea which still lingers in some of the popular text books. The discoveries of Peysonnel made a complete revolution in the study of corals. Ellis also in 1754, proved the animal nature of the hydroid polyps ; like *Sertularia*. From this time writers on polyps became numerous. In the beginning of the present century Lamark, Oken, Lamouroux and Cuvier in their works, brought something of system into the classification of polyps, but still their classifications were unnatural because they united all those polyps that produce hard corals into one group, and those that always remain soft into another. In 1828 Milne Edwards and Audouin made an elaborate study of the anatomy of the polyps, and established the two natural orders determined by the number and structure of the tentacles. The intimate relation between the Actinias and coral polyps, had however been well shown by Charles A. Lesueur in a paper, accompanied by excellent plates, published in the Journal of the Philadelphia Academy in 1817.

Among the numerous works published during the past twenty-five years, the magnificent work of Prof. J. D. Dana, of New Haven, on the Zoophytes of the U. S. Exploring Expedition, under Capt Wilkes, deserves particular notice. This work is accompanied by a large number of excellent plates of the coral polyps drawn from life. This work was published in 1846.

About this time a series of monographs of various families of corals were commenced by Milne Edwards and Jules Haime. These appeared at various times, from 1845 to 1855, and in 1857 the work entitled Histoire Naturelle des Coralliaires was published. This is a complete work on the

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whole class of polyps, both recent and fossil, and must remain the standard work on this class for many years. It appeared under the name of Milne Edwards alone, M. Haime having died in 1856, but his cooperation in the preparation of the work is fully acknowledged in the preface.

Since these careful researches of Milne Edwards and Haime have been published, it may be stated that the polyps are known about as thoroughly as any other class.

A. E. Verrill presented the following catalogue of the birds found at Norway, Maine, containing notes on each species, such as their relative abundance, the season of the year when found, the time of arrival in spring, and when possible, the time of laying the eggs.

Catalogue of the Birds found at Norway, Oxford Co., Maine.

BY A. E. VERRILL.

In the preparation of the following catalogue I have endeavored to give a correct idea of the ornithology of a single locality, but do not offer it as a complete enumeration of all the species that may be found there. It is indeed quite probable that several additional species of the smaller birds, such as Warblers, and Sparrows may be not uncommon, and that various others may be occasionally found as rare or accidental visitors. But it seems to me much more important in the study of the geographical distribution of birds, to know the common and most characteristic birds of any region and their relative abundance, than to know every species found there without knowing which are common and which rare or merely accidental. It is to be regretted that so many local lists have been published consisting merely of an enumeration of names with no indication of those that really belong to the region, in distinction from those that are mere stragglers, belonging properly in some other country. It is also very important to make a distinction between those that are resident at the locality during the whole year and those that are migratory and found only at certain seasons; and among the migratory ones, those

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that are found in summer, and breed, should be distinguished from those that breed further north and come to us only in winter, or in spring and fall during their migrations.

For these reasons I have added remarks after each species indicating its season and relative abundance as far as known to me, and also, when possible, the time of laying the eggs or of hatching the young. I regret that I have not been able to make these observations more complete, and would call the attention of our naturalists residing in the country to these important questions as offering a field for useful and interesting study. The time occupied in incubation also, is known for very few of our most common birds. Another interesting question, upon which I trust the present list will throw some light, is the determination of the boundaries between the Canadian Fauna and that of the Eastern United States, or Alleghanian Fauna.* Although many of our common birds range during the breeding season from Virginia, or even farther south, to Labrador, yet when we compare the birds of Canada or northern Maine, as a whole, with those of Massachusetts or any more southern locality, we find them very different. Many of the most common Canadian summer birds visit us only in winter, or are seen only during there passage to and from a still more southern climate, and other species that reside there during the whole year are never seen, except in rare instances, farther south than Northern New England.

Among the first, I will mention for examples the common Blue Snow Bird, Pine Finch, Canada Jay, White-winged Crossbill, Pine Grosbeak, Black-poll Warbler, Fox-colored Sparrow and many kinds of Ducks and Waders. Among the resident birds of Canada, the Spruce Partridge, Ptarmigan, Hawk Owl, and Black Three-toed Woodpecker are examples. On the contrary, many of our common species do not breed in Canada or are rare there except in some peculiar localities, while other species that are abundant here become less common northward and are gradually replaced by allied species having similar habits, though not always belonging to the same genera.

* The term "Alleghanian Fauna" was applied in 1853 to the fauna of the middle and Eastern States, by Prof. L. Agassiz, in "A Sketch of the Natural Provinces of the Animal World and their Relation to the different Types of Man," in Nott and Gliddon's "Types of Mankind."

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There is still a great amount of uncertainty concerning the distribution and range of our smaller birds, although it is to these that we must chiefly look for the determination of Faunæ, but as far as my observations go the following appear to be instances of representation. The Towhee Bunting in the Alleghanian Fauna is represented by the Fox-colored Sparrow in the Canadian; the Grass Sparrow, by the Savannah; the Song Sparrow, in part by the White-throated; the Chipping Sparrow, in part by the Tree Sparrow and Blue Snow Bird; the Pine Warbler, by the Yellow Rump; the Prairie Warbler, by the Magnolia and Black Poll; Wilson's Thrush, by Swainson's Thrush. These are not however given with much confidence, since the observations have not yet been made sufficiently general. Many other more or less doubtful instances might be added, especially among the warblers and flycatchers, but much still remains to be done concerning these very interesting groups. It seems to be well established however that there are two distinct Faunæ as indicated above. The chief difficulty is to determine their boundaries. To me it seems best to take, as a guide in determining the northern limits of the Alleghanian Fauna, the most southern localities in which those birds peculiar to the Canadian Fauna commonly breed. The line thus established seems to separate the two Faunæ more distinctly than any other. The birds which have been most useful in this investigation, their habits being best known, are the Blue Snow Bird, Pine Finch, Canada Jay, Crossbills, Black-Poll Warbler, and Spruce Partridge. Whenever these breed abundantly in any region it may safely be considered as belonging to the Canadian Fauna. According to this arrangement the Adirondack region of New York, the northern parts of Vermont and New Hampshire, including most of the higher parts of the Green Mountains and all of the White Mountains, and even the summits of the higher Alleghanies, will be included in the Canadian Fauna. But the Alleghanian Fauna will extend northward into some parts of Canada West, about Lake Ontario, and along the valley of the St. Lawrence, perhaps as far as Montreal. In Maine the Canadian Fauna will embrace most of the northern portion of the state extending southward as far as the Umbagog Lakes in the western part. Concerning central and northeastern Maine I cannot speak with certainty, but

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the coast region, from Mount Desert to Eastport, together with the islands in the Bay of Fundy, and the southeastern coast of New Brunswick, belong to the Canadian Fauna.

The central and southern parts of Nova Scotia however, are somewhat more southern in character.

It will doubtless be found that other animals, and perhaps plants, agree to a certain extent with the birds in their distribution. I have found that forests of Spruce and White Birch, so characteristic of the northern parts of New England, generally commence with the southern limits of the Canadian Fauna, yet most of the birds seem in no way dependent upon such forests, and many do not even frequent them.

The situation of Norway is about forty miles south of the Umbagog Lakes, and about the same distance north of Portland, yet the birds agree more nearly with those of Massachusetts than with those of the Umbagog region. It may be considered as very near the northern limit of the Alleghanian Fauna.

The notes and specimens that have served for the basis of the following list were obtained during a residence of several years at the locality, but I have also received much assistance and many specimens from my brothers, B. D. Verrill and G. W. Verrill, and from my friend Mr. Sydney I. Smith.

In this list I have followed the classification adopted by Prof. S. F. Baird in the General Report on the Birds of North America, (Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean, vol. ix.)

FALCO ANATUM, Bon. *Duck Hawk.* Spring and fall. Rare. I have seen this species only during the migrations of the ducks in spring and fall. I have been informed by George A. Boardman Esq. of Milltown, Maine, that he has known it to breed on a cliff at Grand Menan.

F. COLUMBARIUS, Linn. *Pigeon Hawk.* Spring and fall. Rare. I have never succeeded in obtaining a specimen of this hawk at Norway, and have seen it only a few times. The species generally called "Pigeon Hawk" in New England is Accipiter fuscus.

F. CANDICANS, Gm. *Jer Falcon*, "*White Hawk.*" Winter. Not uncommon. A white hawk probably of this

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species is frequently seen during winter flying about extensive meadows near Norway, but they are very shy and watchful and I have never been able to procure a specimen.

F. SPARVERIUS, Linn. *Sparrow Hawk.* Spring and fall. Not very common. This species possibly breeds at Norway although I have never seen it there in summer.

ASTUR ATRICAPILLUS, Bon. *Goshawk,* "*Blue Hawk.*" Resident. Common. Breeds. This is one of our most common hawks. When in the brown immature plumage it is usually confounded under the name of "Hen Hawk," with Buteo borealis and B. lineatus. It may always be distinguished readily from either, by its more slender form, relatively longer legs and tail, and shorter wings.

ACCIPITER COOPERII, Bon. *Cooper's Hawk.* Summer visitant. Not common.

A. FUSCUS, Bon. *Sharp-shinned Hawk.* Summer visitant. very common. Breeds. Arrives the last of March or first of April. The young are fully grown by the first of August.

BUTEO BOREALIS, Vieill. *Red-tailed Hawk.* "*Hen Hawk.*" Summer visitant. Common. Breeds. Arrives about the middle of March. The eggs are laid about the middle of April.

B. LINEATUS, Jard. *Red-shouldered Hawk.* Summer visitant. Not very common. Breeds. The only eggs of this species that I have obtained at Norway were collected May 24th, 1860. The differences in size between specimens referred to this species from Florida, and those from Maine and other parts of New England, are very great, and may indicate a specific difference, although there is little or no difference in color. Nor would this be the only instance in this family where species, recognized as distinct, differ in no important character except size. This is particularly the case in the three North American species of Accipiter. I give below a table of comparative measurements taken from specimens in the Museum of Comparative Zoology at Cambridge, except the last one which is copied from measurements given in the General Report on the Birds of North America.

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Locality and by whom collected	Norway, Me., R. D. Verrill, May 24, 1860.	Brookline, Mass., E. Cabot, March, 1861.	Maine.	Florida, G. Wurdemann, Aug. 1, 1858.	Florida, G. Wurdemann, April 6, 1858.	Florida. G. Wurdemann, April 21, 1857.
Length, - -	19 in.			15.50*	15.75*	17.50
Extent, - -	41.50			34.50*	35.75*	37.00
Wing, - - -	13.50	13.75	14.00	10.50	11.00	11.10
Tail, - - - -	9.00	8.50	9.00	7.30	7.25	
Tarsus, - -	3.20	3.00	3.20	2.80	2.70	
Leg from knee joint,	9.50		9.75	7.50	7.50	
Nature of specimen,	Alcoholic.	Skin.	Skin.	Skin.	Skin.	Skin.
Sex and number,	No. 608	309 ♀	310 ♀	young 680 ♀	681 ♂	8630 ♀

It is stated however by several excellent observers that the difference of size, in this, and several other species of hawks, is due to the effect of the climate, and, that intermediate forms exist in the Middle States. By Audubon they were considered distinct species, the northern form being called Falco hyemalis, Gm. He also states that they differ greatly in their habits. For the present therefore it may be well to consider the large northern form as a variety, applying to it the name, *Buteo lineatus*, var. *hyemalis*, *Gm.*

BUTEO PENNSYLVANICUS, Bon. *Broad-winged Hawk.* Summer visitant. Common. Breeds. A nest found June 12th, 1858, contained two eggs nearly hatched. This species is still more abundant near the Umbagog Lakes, and is apparently the most common Hawk in that vicinity..

*Measurements made from the specimens while fresh, by the collector.

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ARCHIBUTEO SANCTI-JOHANNIS, Gray. *Black Hawk.* Winter visitant. Not common. This species is occasionally seen in autumn and winter. I have never met with *A. lagopus*, although it probably occurs.

CIRCUS HUDSONIUS, Vieill. *Marsh Hawk.* Summer visitant. Very common. Breeds. Arrives from the middle to the last of April. Lays generally six eggs in a nest on the ground. I have found young just hatched, June 9th, and others just beginning to fly, July 9th.

AQUILA CANADENSIS, Cassin. *Golden Eagle.* Winter. Rare.

HALIAETUS LEUCOCEPHALUS, Savigny. *White-headed Eagle.* Resident. Common. Breeds. Usually, but improperly called "Bald Eagle." I have been told by an old hunter, of an eagle of much larger size killed in this region, which may have been the little known "Washington Eagle" of Audubon.

PANDION CAROLINENSIS, Bon. *Fish Hawk.* Summer visitant. Not very common. Frequently seen about our lakes and rivers in summer, but I have never found it breeding in this vicinity. Arrives about the middle of April.

BUBO VIRGINIANUS, Bon. *Great Horned Owl.* "*Cat Owl.*" Resident. Very common. Breeds. I have obtained the young of this species nearly half grown, but still covered with down, May 1st, 1857, from a nest in a tall, hollow pine. There were three young in the nest, one of which was considerably smaller than the other two. One of the latter, a male, is now alive at the Aquarial Gardens in Boston, and is in excellent plumage and of unusually large size, but has never shown any signs of gentleness or submission. I have obtained young just beninning to fly, June 8th. I have seldom found nests among the branches of trees.

SCOPS ASIO, Bon. *Mottled Owl, Red Owl, Screech Owl.* Resident. Common. Breeds.

OTUS WILSONIANUS, Les. *Long-eared Owl.* Resident. Common. Breeds. This species is quite common, especially in autumn.

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The *Short-eared Owl* (*Brachyotus Cassinii*) probably also occurs, but I have never obtained any specimens.

SYRNIUM CINEREUM, Aud. *Great Gray Owl.* Winter visitant. Very rare.

S. NEBULOSUM, Gray. *Barred Owl.* Resident. Common. Breeds.

NYCTALE ACADICA, Bon. *Saw-whet Owl, Little Owl.* Resident. Common. Breeds.

NYCTEA NIVEA, Gray. *Snowy Owl.* Winter visitant. Not common. This species is very gentle and becomes tame very readily in confinement, differing greatly in this respect from the Great Horned Owl.

SURNIA ULULA, Bon. *Hawk Owl.* Autumn and winter. Common. This species is quite common from the first of November to the middle of March. I have never seen it in summer.

COCCYGUS AMERICANUS, Bon. *Yellow-billed Cuckoo.* Summer visitant. Not common. I have never found nests of this species at Norway, although it probably breeds there.

C. ERYTHROPHTHALMUS, Bon. *Black-billed Cuckoo.* Summer visitant. Common. Breeds. Much more common than the last. Have not observed it before the 20th of May.

PICUS VILLOSUS, Linn. *Hairy Woodpecker.* Resident. Very common. Breeds.

P. PUBESCENS, Linn. *Downy Woodpecker.* Resident. Very common. Breeds. The young remain in the nest until the last of July or first of August, and are then fully grown.

PICOIDES ARCTICUS, Gray. *Black-backed Three-toed Woodpecker.* Spring, fall and winter. Very common. This species is abundant from the middle of October to the middle of March. Have never seen it here in summer.

SPHYRAPICUS VARIUS, Baird. *Yellow-bellied Woodpecker.* Summer visitant. Common. Breeds. Arrives about the middle of April. This is the true "Sap Sucker" which injures apple trees, though the Downy Woodpecker is too often unjustly punished for it.

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HYLATOMUS PILEATUS, Baird. *Pileated Woodpecker, Black Woodcock.* Resident. Common. Breeds. Most common in winter.

MELANERPES ERYTHROCEPHALUS, Sw. *Red-headed Woodpecker.* Summer visitant. Rare.

COLAPTES AURATUS, Sw. "*Yellow Hammer.*" Summer visitant. Very common. Breeds. Generally arrives the last of March. Eggs laid the last week in May.

TROCHILUS COLUBRIS, Linn. *Humming Bird.* Summer visitant. Common. Breeds. Arrives about the middle of May.

CHAETURA PELASGIA, Steph. *Chimney Swallow.* Sum- visitant. Abundant. Breeds. Arrives the second week in May.

ANTROSTOMUS VOCIFERUS, Bon. *Whip-poor-will.* Summer visitant. Common. Breeds. Arrives May 3d to 20th. The eggs are laid the first of June.

CHORDEILES POPETUE, Baird. *Night Hawk.* Summer visitant. Common. Breeds. Arrives the last of April. Eggs laid early in June.

CERYLE ALCYON, Boir. *Belted King Fisher.* Summer visitant. Common. Breeds. Sometimes seen in winter, but not numerous until the middle of April. Have found the eggs in March.

TYRANNUS CAROLINENSIS, Baird. *King Bird.* Summer visitant. Very common. Breeds. Arrives about May 10th. Eggs are laid the first week in June.

MYIARCHUS CRINITUS, Cab. *Great Crested Flycatcher.* Summer visitant. Rare.

SAYORNIS FUSCUS, Baird. *Pewee.* Summer visitant. Common. Breeds. Often seen as early as the first of March, and becomes common by the first of April. Very irregular in its time of nesting. The young are generally hatched the last of May.

CONTOPUS BOREALIS, Baird. *Olive-sided Flycatcher.* Summer visitant. Not very common. Probably breeds. Not observed before the 20th of May. This species is

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quite common at the Umbagog Lakes.

C. VIRENS, Cab. *Wood Pewee.* Summer visitant. Common. Breeds. Arrives the last of May. Much less common than in Massachusetts.

EMPIDONAX TRAILLII. Baird. *Traill's Flycatcher.* Summer visitant. Not common. Arrives the third week in May.

E. MINIMUS. Baird. *Least Flycatcher.* Summer visitant. Common. Breeds. Arrives about the middle of May.

E. FLAVIVENTRIS, Baird. *Yellow-bellied Flycatcher.* Summer visitant. Not very common. The only specimens procured were shot from the last of May to the middle of June.

TURDUS PALLASII, Cab. *Hermit Thrush.* Summer visitant. Very common. Breeds. This is the most common Thrush except the Robin. The nest is built upon the ground. The eggs, four in number, are rather oblong and bright blue. Arrives April 16th to 25th. The eggs are laid the last of May.

T. FUSCESCENS, Steph. *Wilson's Thrush.* Summer visitant. Not common. Breeds. Builds its nest upon the ground. Eggs light blue.

T. SWAINSONII, Cab. *Olive-backed Thrush.* Summer visitant. Rare. More common northward. I have never found this species breeding at Norway. The nest is built in low trees or bushes. The eggs are bluish-green spotted with light brown.

T. MIGRATORIUS, Linn. *Robin.* Summer visitant. Very abundant. Breeds. Arrives the last of March. Eggs are laid the second week in May.

SIALIA SIALIS, Baird. *Blue Bird.* Summer visitant. Very common. Breeds. Generally arrives the last week in March. The eggs are often laid the third week in April. Sometimes remains till the middle of October.

REGULUS CALENDULA, Licht. *Ruby-crowned Wren.* Spring and fall. Sometimes very common in May. Arrives in spring about the 20th of April. Common in fall the last of October and first of November.

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R. SATRAPA, Licht. *Golden-crested Wren.* Spring and fall. Not very common. According to Mr. S. I. Smith a few remain during summer in the dense cedar swamps and probably breed. Arrives in spring about the 20th of April. In fall, common from the last of October to December.

MNIOTILTA VARIA, Vieill. *Black and White Creeper.* Summer visitant. Not common. Breeds.

PARULA AMERICANA, Bon. *Blue Yellow-backed Warbler.* Summer visitant. Not common. Breeds. Not observed before the 20th of May.

GEOTHLYPIS TRICHAS, Cab. *Maryland Yellow Throat.* Summer visitant. Very common. Breeds. Arrives about the middle of May. The eggs are laid the last of May or first of June.

The Mourning Warbler (*G. Philadelphia*) will probably be found, but I have not observed it.

HELMINTHOPHAGA RUFICAPILLA, Baird. *Nashville Warbler.* Summer visitant. Rare. Arrives the second week in May. Sometimes common in spring.

The Tennessee Warber (*H. peregrina*) will probably be found as a rare species.

SEIURUS AUROCAPILLUS Sw. *Golden-crowned Thrush. Oven Bird* Summer visitant. Common. Breeds. Arrives early in May.

S. NOVEBORACENSIS, Nutt. *Water Thrush.* Summer visitant. Not very common. A nest, found June 8, 1861, in a dense cedar swamp, was built in an excavation in the side of a decayed moss covered log, so that the excavation itself formed an arch over the nest, instead of one made by the bird, as in the preceding species. The nest was constructed of moss and lined with fine roots. The five eggs, were of a delicate flesh color, spotted with light reddish brown. Arrives the first of May.

DENDROICA VIRENS, Baird. *Black-throated Green Warbler.* Summer visitant. Not common. Breeds. Arrives the second week in May.

D. CANADENSIS, Baird. *Black-throated Blue Warbler.* Summer visitant. Not common.

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D. CORONATA, Gray. *Yellow-rumped Warbler.* Spring and autumn. Very commom. Not known to breed in this vicinity. Arrives the first week in May.

D. BLACKBURNIÆ, Baird. *Blackburnian Warbler.* Summer visitant. Not uncommon, but rarely seen on account of its habit of keeping concealed among the dense foliage. Breeds. Arrives the third week in May.

D. CASTANEA, Baird. *Bay-breasted Warbler.* Spring and fall. Rare. The only specimen obtained was shot by my brother, G. W. Verrill, in June.

D. PENNSYLVANICA, Baird. *Chestnut-sided Warbler.* Summer visitant. Rather common. Breeds. Arrives the second week in May.

D. STRIATA, Baird. *Black Poll Warbler.* Summer visitant. Not often seen at Norway in summer, but very common at the Umbagog Lakes.

D. ÆSTIVA, Baird. *Yellow Warbler*, often called *Summer Yellow Bird.* Summer visitant. Very common. Breeds. Arrives about the middle of May. The eggs are laid the first week in June.

D. MACULOSA, Baird. *Magnolia Warbler.* Spring and fall. Not common. One specimen was shot in June. Not known to breed here.

The Cape May Warbler, (*D. tigrina*) will probably be found as a rare bird.

D. PALMARUM, Baird. *Yellow Red-poll Warbler.* Spring and fall. Common. Arrives about the middle of April, earlier than any other Warbler. Possibly a few may remain and breed. Common the last of September and first of October, leaves about the middle of October.

MYIODIOCTES PUSILLUS, Bon. *Wilson's Black-cap Flycatcher.* Summer visitant. Not common. The only specimen obtained at Norway was shot by Clarence M. Smith, in June.

M. CANADENSIS, Aud. *Canada Flycatcher.* Summer visitant. Common. Breeds. Arrives about the middle of May.

SETOPHAGA RUTICILLA, Sw. *Red Start.* Summer visitant. Common. Breeds. Arrives about the middle of May.

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PYRANGA RUBRA, Vieill. *Scarlet Tanager.* Summer visitant. Rare.

HIRUNDO HORREORUM, Barton. *Barn Swallow.* Summer visitant. Abundant. Breeds. Arrives April 22d to May 1st.

H. LUNIFRONS, Say. *Eaves Swallow, Cliff Swallow.* Summer visitant. Abundant. Breeds. Arrives early in May. The eggs are laid the first of June.

H. BICOLOR, Vieill. *White-bellied Swallow.* Summer visitant. Common. Breeds. Arrives by the middle of April. Generally nests in "Martin Houses," or in sheltered places about the eaves of buildings.

COTYLE RIPARIA, Boie. *Bank Swallow.* Summer visitant. Abundant. Breeds. Arrives the second week in May. The eggs are laid the first week in June.

PROGNE PURPUREA, Boie. *Martin.* Summer visitant. Abundant. Breeds. Arrives the last week in April. Sometimes a few come a little earlier.

AMPELIS CEDRORUM, Baird. *Cedar Bird.* Summer visitant Abundant. Breeds. Sometimes seen as early as the first of March, but is quite irregular in its habits.

COLLYRIO BOREALIS, Baird. *Butcher Bird Shrike.* Autumn and winter. Common.

VIREO OLIVACEUS, Vieill. *Red-eyed Flycatcher.* Summer visitant. Very common. Breeds. Arrives about the middle of May.

V. GILVUS, Bon. *Warbling Flycatcher.* Summer visitant. Common. Breeds. Arrives the first of May.

V. SOLITARIUS, Vieill. *Blue-headed Flycatcher.* Summer visitant. Not very common. Breeds. Arrives during the second week in May.

MIMUS CAROLINENSIS, Gray. *Cat Bird.* Summer visitant. Very common. Breeds. Arrives May 15 to 20th. The eggs are laid the second week in June.

HARPORHYNCHUS RUFUS, Cab. *Brown Thrush.* Summer visitant. Common. Breeds. Arrives about the middle of May. The eggs are laid the first of July and perhaps earlier.

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TROGLODYTES ÆDON, Vieill. *House Wren.* Summer visitant. Common. Breeds. Arrives about the middle of May.

T. HYEMALIS, Vieill. *Winter Wren.* Probably resident. Not common. I have seen it only in spring.

T. AMERICANUS, Aud. *Wood Wren.* Spring and fall. Not common. Possibly breeds.

CERTHIA AMERICANA, Bon. *American Brown Creeper.* Summer visitant. Not common. Breeds.

SITTA CAROLINENSIS, Gm. *White-bellied Nuthatch.* Resident. Common. Breeds.

S. CANADENSIS, Linn. *Red-bellied Nuthatch.* Resident. Very common. Breeds.

PARUS ATRICAPILLUS, Linn. *Chickadee.* Resident. Very common. Breeds. The eggs are laid in May. I have found young the first week in June.

EREMOPHILA CORNUTA, Boie. *Shore Lark.* Winter visitant. Not common.

PINICOLA CANADENSIS, Cab. *Pine Grosbeak.* Winter visitant. Very common.

CARPODACUS PURPUREUS, Gray. *Purple Finch.* Summer visitant. Common but much less abundant than near the Umbagog Lakes. Breeds. Arrives the first of April.

CHRYSOMITRIS TRISTIS, Bon. *Yellow Bird, Thistle Bird.* Summer visitant. Very common. Breeds. Arrives the second week in May. Remains till the first of November.

C. PINUS, Bon. *Pine Finch.* Spring and Autumn. Common. Not observed breeding at Norway, but found very common near the Umbagog Lakes in July, evidently breeding. Breeds, also, among the White Mountains, where it is very common.

CURVIROSTRA AMERICANA, Wils. *Red Crossbill.* Spring and summer. Common.

C. LEUCOPTERA, Wils. *White-winged Crossbill.* Winter visitant. Common.

ÆGIOTHUS LINARIA, Cab. *Red Poll Linnet.* Fall, winter and spring. Very common. Most abundant in March and April.

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PLECTROPHANES NIVALIS, Meyer. *Snow Bunting, White Snow Bird.* Winter visitant. Common.

The Lapland Longspur (P. lapponicus) will also undoubtedly be occasionally met with, in winter.

PASSERCULUS SAVANNA, Bon. *Savannah Sparrow.* Summer visitant. Common. Breeds. Arrives April 15th to 20th. The eggs are usually laid by the middle of May.

POŒCETES GRAMINEUS, Baird. *Grass Finch.* Summer visitant. Common. Breeds. Arrives about the middle of April. The eggs are laid the first of June.

ZONOTRICHIA LEUCOPHRYS, Sw. *White-crowned Sparrow.* Spring and fall. Rare.

Z. ALBICOLLIS, Bon. *White-throated Sparrow, "Peabody Bird."* Summer visitant. Common. Breeds. This beautiful sparrow, though quite common at Norway, is much more abundant near the Umbagog Lakes. Arrives about the middle of April.

JUNCO HYEMALIS, Sclat. *Blue Snow Bird.* Winter, spring and fall. Abundant. I have never found this bird breeding at Norway, but it is very common, and breeds, at the Umbagog Lakes and among the White Mountains.

SPIZELLA MONTICOLA, Baird. *Tree Sparrow.* Spring and fall. Common. Most abundant from the middle to last of April.

S. PUSILLA, Bon. *Field Sparrow.* Summer visitant. Common. Breeds. Arrives the last of April.

S. SOCIALIS, Bon. *Chipping Sparrow.* Summer visitant. Very common. Breeds. Arrives the first week in April. The eggs are laid the last of May.

MELOSPIZA MELODIA, Baird. *Song Sparrow.* Summer visitant. Very common. Breeds. Arrives March 18 to 30th. The eggs are laid about the middle of May.

M. PALUSTRIS, Baird. *Swamp Sparrow.* Summer visitant. Not common. Breeds.

PASSERELLA ILIACA, Sw. *Fox-colored Sparrow.* Spring and fall. Common.

GUIRACA LUDOVICIANA, Sw. *Rose-breasted Grosbeak.* Summer visitant. Not common.

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CYANOSPIZA CYANEA, Baird. *Indigo Bird.* Summer visitant. Common. Breeds. Arrives early in May.

PIPILO ERYTHROPHTHALMUS, Vieill. *Towhee Bunting.* Summer visitant. Not common. Breeds. Arrives the first of May.

DOLICHONYX ORYZIVORUS, Sw. *Bobolink.* Summer visitant. Very common. Breeds. Arrives about the middle of May. The eggs are laid early in June.

MOLOTHRUS PECORIS, Sw. *Cow Blackbird.* Summer visitant. Common. Breeds. Arrives usually the first week in April.

AGELÆUS PHŒNICEUS, Vieill. *Red-wing Blackbird.* Summer visitant. Very common. Breeds. Arrives March 20th to April 4th. The eggs are laid the last of May.

ICTERUS BALTIMORE, Daud. *Baltimore Oriole.* Summer visitant. Common. Breeds. Arrives from the first, to the middle of May.

SCOLECOPHAGUS FERRUGINEUS, Sw. *Rusty Blackbird.* Spring. Common. Arrives before the middle of April.

QUISCALUS VERSICOLOR, Vieill. *Crow Blackbird.* Summer visitant. Common. Breeds. Arrives the last of March or first of April.

CORVUS AMERICANUS, Aud. *Common Crow.* Resident. Very abundant. Breeds. Not often seen in midwinter. The eggs are laid at various times from April to June. I have found young nearly large enough to fly May 25th, and eggs at the same time.

C. CARNIVORUS, Bart. *American Raven.* Accidental. Very rare.

CYANURA CRISTATA, Sw. *Blue Jay.* Resident. Abundant. Breeds. Not often seen in midwinter. Becomes abundant by the middle of March.

PERISOREUS CANADENSIS, Bon. *Canada Jay.* Winter visitant. Common.

ECTOPISTES MIGRATORIA, Sw. *Wild Pigeon.* Summer visitant. Common. Breeds. Arrives from the 7th of April to the 4th of May.

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TETRAO CANADENSIS, Linn. *Spruce Partridge.* Accidental and very rare at Norway, but a common resident near the Umbagog Lakes.

BONASA UMBELLUS, Steph. *Ruffed Grouse*, "*Partridge.*" Resident. Very common. Breeds. The drumming of the male, I have heard from the 10th of April to the 7th of June. The young are hatched about the first of June.

ARDEA HERODIAS, Linn. *Great Blue Heron.* Summer visitant. Common. Breeds in cedar swamps abundantly. There are generally several nests in a tree. Arrives the last of March or first of April.

BOTAURUS LENTIGINOSUS, Steph. *Bittern*, "*Stake Driver.*" Summer visitant. Common. Breeds. Arrives early in May, perhaps earlier.

CHARADRIUS VIRGINICUS, Borck. *Golden Plover.* Autumn. Common.

PHILOHELA MINOR, Gray. *American Woodcock.* Summer visitant. Not common. Breeds.

ACTODROMAS MACULATA, Cassin. *Jack Snipe.* Autumn. Not common. One specimen obtained and several others seen.—S. I. Smith.

GAMBETTA MELANOLEUCA, Bon. *Tell Tale.* Summer visitant. Not common.

G. FLAVIPES, Bon. *Yellow Legs.* Summer visitant. Not common. Have seen this, or the preceding, species about the Umbagog Lakes in summer, where it probably breeds in small numbers.

RHYACOPHILUS SOLITARIUS, Bon. *Solitary Sandpiper.* Summer visitant. Not very common. It is doubtful whether it breeds here. Arrives the first of May or earlier.

TRINGOIDES MACULARIUS, Gray. *Spotted Sandpiper.* Summer visitant. Very common. Breeds. Arrives the first of April.

ACTITURUS BARTRAMIUS, Bon. *Field Plover.* Summer visitant. Common. Breeds. Arrives in April. The eggs are laid about the first of June.

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PORZANA CAROLINA, Vieill. *Common Rail.* Summer visitant. Not common.

BERNICLA CANADENSIS, Boie. *Wild Goose.* Spring and fall. Common.

B. BRENTA, Steph. *Brant.* Spring and Fall. Common.

ANAS BOSCHAS, Linn. *Mallard.* Spring and fall. Rare.

A. OBSCURA, Gm. *Black Duck.* Summer visitant. Common. Breeds. Arrives the last of March or first of April. The young are hatched during the latter part of June. The eggs are often laid before the middle of May.

QUERQUEDULA DISCORS, Steph. *Blue-winged Teal.* Spring and fall. Common.

AIX SPONSA, Boie. *Wood Duck.* Summer visitant. Common. Breeds.

FULIX AFFINIS, Baird. *Black-headed Duck.* Spring and fall. Not common.

F. COLLARIS, Baird. *Ring-necked Duck.* Spring and fall. Not common.

AYTHYA AMERICANA, Bon. *Red-headed Duck.* Spring and fall. Rare.

BUCEPHALA AMERICANA, Baird. *Golden Eye, "Whistler."* Spring and fall. Common. Sometimes seen in midwinter.

B. ALBEOLA, Baird. *Buffel Head.* Spring and fall. Common.

HARELDA GLACIALIS, Leach. *Old Squaw.* Spring and fall. Not common.

PELIONETTA PERSPICILLATA, Kaup. *Surf Duck.* Spring fall. Rare.

MERGUS AMERICANUS, Cass. *Sheldrake.* Spring and fall. Common.

M. SERRATOR, Linn. *Red-breasted Sheldrake.* Spring and fall. Not common.

LARUS ARGENTATUS,* Brunn. *Herring Gull.* Accidental. Often seen about our rivers and lakes in summer.

* Since this was written, the American Herring Gull has been separated from the European, under the name of Larus Smithsonianus, by Mr. Elliott Coues. (See Proc. Phil. Acad. Nat. Sc. 1862, p. 296.)

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CHRŒCOCEPHALUS PHILADELPHIA, Lawr. *Bonaparte's Gull.*
Spring and fall. Not common. Often seen about our rivers and lakes, and can hardly be considered as accidental.

A specimen in immature plumage shot Aug. 10, 1858 is remarkable for the shortness and slenderness of its bill even when compared with other specimens shot at the same season, but as in other species of gulls the bill is a long time in reaching its full length, this may be due merely to age. In this specimen the head and neck are white with a broad patch of grayish slate on the upper and posterior part of the head and a roundish spot of slate below and posterior to each eye. This spot is formed by the dark tips of the auriculars. The back and greater wing coverts are light grayish blue, but this color is nearly concealed on the back between the shoulders and on the scapulars by the brownish tips of the feathers, each of these being edged and broadly tipped with yellowish white and below this with brown; some of the lesser coverts are of the same color, but those near the bend of the wing are dark slate.

The primaries are all tipped with black for about an inch and this color extends along the whole length of the outer and part of the inner webs of the two first primaries, and along the greater part of the outer web of the third; the other primaries, with the extreme tips of all except the two first, are light bluish gray; the rump, tail coverts, and greater part of the tail, pure white; the tail is crossed at the end by a band of black three-fourths of an inch wide, the extreme tips of the tail feathers being white. All the under parts pure white, except the sides of the breast where there is a patch of very light brown; bill light brown at the base, darker at the end; legs and feet very light yellow without any tinge of the orange-red seen in those of the adult. The bill is slender, slightly curved at the end, and without the notch seen in that of the mature bird.

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Comparative Measurements.

	No. 146	No. 173
Length (fresh specimens) - - - - -	14 in.	13.50
Extent of wings, - - - - - -	33	31.50
Wing, - - - - - - - -	10.50	10.25
Tarsus, - - - - - - - -	1.30	1.28
Middle toe, - - - - - - -	1.42	1.40
Head and bill, - - - - - - -	3.00	2.70
Bill along top, - - - - - - -	1.30	1.00
Bill from feathers of side of upper mandible,	1.05	.84
Bill from do. of lower mandible, -	1.30	1.00
Bill from the nostrils, - - - - -	.67	.52
Bill from prominence of the lower mandible,	.50	.35
Width of bill (opposite feathers of the side)	.24	.16

No. 146 is a full plumaged male shot in May..
No. 173 is the young specimen described above.

COLYMBUS TORQUATUS, Brunn. *Loon. Northern Diver.* Summer visitant. Very common. Breeds. Arrives about the middle of April. The eggs are laid about the middle of June and sometimes later. Young are hatched the first week in July.

C. ARCTICUS, (?) Lian. *Black-throated Diver.* A specimen in immature plumage shot May 6th, 1858, agrees very closely with Audubon's description of the young of this species, but seems to be rather the young of C. torquatus. I have never obtained an undoubted specimen of C. arcticus.

PODICEPS CORNUTUS, Lath. *Horned Grebe.* Spring and Fall. Not common.

PODYLIMBUS PODICEPS, Lawr. *Water Witch.* Spring and fall. Common. It is possible that this species breeds here, but I have never seen it in summer.

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Birds found in Maine not observed at Norway.

In order to render the foregoing catalogue more complete and valuable for comparison, the following list of additional species, that have been found in other parts of the state, is added. They belong principally to three classes,—1st, those that frequent the seacoast exclusively, either in summer or winter, or during their migrations,—2d, those that belong farther south and only come into the extreme southwestern part of the state, or *occasionally*, farther northward,—3d, those that are accidental visitors from other regions. Besides these there are a few that undoubtedly occur at Norway but have been overlooked, and some that visit the more northern parts of Maine from the artic regions in winter.

When I have not myself observed the species in the state, I have added the name of the person who has made the observations, and in case there are several, the one who has made them the most recently. I have intentionally omitted several species that have been attributed to Maine, because I have no *direct information* concerning them.

Cathartes aura, Ill. Accidental.—G. A. Boardman.

Archibuteo lagopus, Gray. Winter; perhaps resident; not rare.

Brachyotus Cassinii, Brewer. Resident; not uncommon.

Nyctale Richardsoni, Bon. Not common; perhaps resident northward.—G. A. Boardman.

Picoides hirsutus, Gray. Winter; not common. Calais, Me.—G. A. Boardman.

Anthus ludovicianus, Licht. Autumn; occasionally in flocks—G. A. Boardman.

Geothlypis Philadelphia, Baird. Waterville; in July with young.—Prof. C. E. Hamlin.

Helmitherus vermivorus, Bon. Summer; southern Maine; rare.

Helminthophaga peregrina, Cab. Very rare; Headwaters of the Penobscot in June.—W. H. Hall. *H. celata*, is also attributed to Nova Scotia by Audubon.

Dendroica pinus, Baird. Summer; rare.

Dendroica cærulea, Baird. Very rare.—J. J. Audubon.

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Dendroica tigrina, Baird. Calais, Me.; in summer; rare.—G. A. Boardman.

Ampelis garrulus, Linn. Accidental in winter; rare.

Vireo noveboracensis, Bon. Very rare; summer.—J. J. Audubon.

Vireo flavifrons, Vieill. Summer; not common. Waterville in July.—Prof. C. E. Hamlin.

Lophophanes bicolor, Bon. Very rare.—J. J. Audubon.

Parus hudsonicus, Forster. Winter; not rare. Resident near Calais.—G. A. Boardman.

Ægiothus canescens, Cab. Winter; rare.

Plectrophanes lapponicus, Selby. Winter; rare.

Coturniculus, passerinus, Bon. Summer; rare.—G. A. Boardman.

Guiraca cærulea, Sw. Accidental; common in the spring of 1861 at Calais.—G. A. Boardman.

Sturnella magna, Sw. Southern Maine in summer; not common.

Icterus spurius, Bon. Southern Maine in summer; not common.

Zenædura carolinensis, Bon. Southern Maine; not common. Probably breeds.

Lagopus albus, Aud. Northern Maine in winter; rare.

Ardetta exilis, Gray. Southern Maine; rare.

Butorides virescens, Bon. Coast; common in summer.

Nyctiardea Gardeni, Baird. Summer; common; mostly near the coast; breeds in large numbers at Trenton, Maine.

Ægialitis vociferus, Cass. Coast in autumn; not common.

Æ. melodus, Cab. Coast in summer; abundant; breeds.

Æ. semipalmatus, Cab. Coast in autumn; abundant.

Squatarola helvetica, Cuv. Coast in autumn; not common.

Strepsilas interpres, Ill. Coast in autumn; rare.—G. A. Boardman.

Recurvirostra americana, Gm. Coast in spring; one instance.—G. A. Boardman.

Himantopus nigricollis, Vieill. Coast in spring; one instance.—G. A. Boardman.

Phalaropus hyperboreus, Temm. Bay of Fundy, as early at least as August; abundant in autumn; possibly breeds.

Gallinago Wilsoni, Bon. Summer; not rare on the coast; breeds.

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Macrorhamphus griseus, Leach. Coast in summer and autumn.—G. A. Boardman.
Tringa canutus, Linn. Coast in autumn; common.
Arquatella maritima, Baird. Winter; abundant.—G. A. Boardman
Ancylocheilus subarquatus, Kaup. Coast in autumn; not common.—G. A. Boardman.
Pelidna americana, Coues. Coast in autumn; abundant.
Actodromas minutilla, Coues. Coast early in autumn; very abundant.
A Bonapartii, Cass. Coast in autumn; common.
Calidris arenaria, Ill. Coast in summer; abundant.
Ereunetes pusilla, Cass. Coast in autumn; abundant.
Symphemia semipalmata, Hart. Coast in summer; no common.
Philomachus pugnax, Gray. Accidental; one or two instances.—G. A. Boardman.
Limosa fedoa, Ord. Coast in autumn; rare.
Limosa hudsonica, Sw. Coast in autumn and spring; not common.
Numenius longirostris, Wils. Coast in fall and spring; not very abundant.
N. hudsonicus, Lath. Coast in fall and spring; rare.
N. borealis, Lath. Coast in fall and spring; rare.—G. A. Boardman.
Rallus virginianus, Linn. Summer; not common; breeds.
Fulica americana, Gm. Coast in spring and fall; not uncommon.
Anser hyperboreus, Pall. Winter; very rare.
Dafila acuta, Jen. Winter on the coast; rare.
Nettion carolinensis, Baird. Fall and spring; frequent.
Spatula clypeata, Boie. Coast in autumn; rare.
Chaulelasmus streperus, Gray. Coast in spring and fall; rare.
Mareca americana, Steph. Spring and fall; rare.
Fulix marila, Baird. Spring and fall; very rare.
F. affinis, Baird. Spring and fall; more common than the last.
Histrionicus torquatus, Bon. Spring, fall, and winter; common on the coast.
Camptolæmus labradorius, Gray. Coast in winter; very rare.

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Melanetta velvetina, Baird. Coast in winter; common.
Pelionetta perspicillata, Kaup. Coast in winter; common.
Oidemia americana, Sw. Coast in fall and winter; frequent.
Somateria mollissima, Leach. Coast in fall, winter, and spring; common; a few breed on the islands in the Bay of Fundy.
S. spectabilis, Leach. Coast in winter; rare.
Erismatura rubida, Bon. Coast in winter; rare.
Mergus serrator, Linn. Coast in fall and winter; common.
Lophodytes cucullatus, Reich. Coast in autumn; rare; a few breed in the northern part of the state.
Pelecanus erythrorhynchus, Gm. Accidental on the coast; very rare.—G. A. Boardman.
Sula bassana, Briss. Coast in fall, winter, and spring; very common.
Phalacrocorax carbo, Gray. Coast in winter; common.
Graculus dilophus, Gray. Coast in winter; not common.
Thalassidroma Leachii, Temm. Coast; very common; breeds abundantly on many of the islands along the coast, from Mount Desert to Grand Menan, and is much more numerous than any other Petrel.
T. Wilsoni, Bon. Coast; not common. I have never found this species breeding.
T. pelagica, Bon. Off the coast; rare.
Puffinus major, Bon. Coast; common in fall, winter and spring.
P. anglorum, Temm. Coast; common from August to spring.
P. fuliginosus, Strick. Coast; common from August to spring.
Stercorarius, pomarinus, Temm. Autumn and winter on the coast; common.
S. parasiticus, Temm. Coast in winter; common.
S. cepphus, Lawr. Coast; common from August to spring.
Larus leucopterus, Fabr. Coast in winter; rare.
Larus marinus, Linn. Fall and winter; not common. A few appear to breed on the islands in the Bay of Fundy.—G. A. Boardman.
L. delewarensis, Ord. Coast in fall and spring; not common.
Chroæcocephalus atricillus, Lawr. Resident on the coast; a few breed on the islands; not common.

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Rissa tridactyla, Bon. Coast in autumn and winter; common.

Sterna hirundo,* Linn. (S. Wilsoni, Bon.) Coast in summer; common; breeds abundantly in some localities.

S. macroura, Naum. Common on the coast in summer; breeds abundantly on some islands.

Thalasseus caspius, Boie. Coast in winter; rare.

Hydrochelidon fissipes, Gray. (H. plumbea, Lawr.) Coast in autumn; not common.

Colymbus septentrionalis, Linn. Coast in winter; common.

Podiceps Holbolli, Reinh. (P. griseigena Auth.) Coast in winter; common.

P. cristatus, Lath. Summer visitant; breeds about lakes near Calais.—G. A. Boardman.

Utamania torda, Leach. Fall and winter on the coast; common; a few breed about the Bay of Fundy.

Mormon arctica, Ill. Resident on the coast; common; a few breed on the islands about Grand Menan.

M. cirrhata, Pall. Winter; rare.

M. glaciulis, Leach. Grand Menan.—Audubon. Very rare.

Uria grylle, Lath. Resident on the coast; abundant; breeds on rocky islands from Mount Desert eastward.

Catarractes troille, Bryant. Fall and winter on the coast; common; a few breed about the Bay of Fundy.

C. ringvia, Bryant. Fall and winter; common.

C. lomvia, Bryant. Fall and winter; rare.

Mergulus alle, Vieill. Winter; common.

Mr. S. H. Scudder, of the Zoological School at Cambridge, being called upon, stated that he had been examining the collection of butterflies in the Museum of the Institute, a few of which he had brought in for examination. The collection was a valuable one, the specimens mostly Brazilian. He entered into some details of the structure of the wings of butterflies, and explained how the special arrangement and direction of the nervures afforded good characteristics in assisting the Naturalist to determine the affinities of these

*For a very complete revision of the Terns of North America, see A Review of the Terns of N .A. by Elliott Coues. Proc. Acad. Nat. Sc. of Phil. Dec. 1862, p. 535.

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animals, and their groupings into families, genera &c., illustrating his remarks by the specimens exhibited. In closing, Mr. S. presented the following list of the butterflies of New England.

A List of the Butterflies of New England.

BY SAMUEL H. SCUDDER.

In the following list, I have made mention of every species of diurnal Lepidoptera of which I have seen specimens from New England; I enumerate eighty-one species; in the recent edition of Harris's Treatise on Insects injurious to vegetation fifty-four are mentioned; a portion of this difference is made up of those of which only a single individual or two have been seen, and are only occasionally found here, being more abundant to the southward; but there have been added also very many species which may properly be said to belong to the New England Fauna. Of such as are new, or have been confounded with others distinct from them, or have been incorrectly described, I have given short descriptions; these are mostly found among the Hesperidae, where also are to be found the principal additions to the number of our Butterflies in the recent edition of Dr. Harris's Treatise; whenever names are given different from those used in Harris's Treatise, I have given his as synonyms to avoid any confusion which might arise, and these are the only synonyms I have given, except in those cases where it was evidently necessary (e. g. Hesperia Egeremet). In all cases I have stated to the extent of my knowledge their comparative rarity or abundance, and have frequently mentioned whether they were more abundant in the northern or southern portion of New England. I have endeavored also to place in a succinct form what knowledge of each species we yet possess as to the haunts of the imago, the number of broods each year, their times of appearance, and the food-plant of the larva; this is given rather to stimulate further detailed enquiry by showing the paucity of our knowledge, than as any material addition to what has heretofore been published; with the hope that it may render some service in this direction it is offered to the Institute for publication.

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1. PAPILIO ASTERIAS Drury. Open Fields and upon flowers; common; there are two broods each year, the first appearing in early June, from the eggs of which the caterpillars are hatched, which are the young of those appearing early in August, but as the perfect insects are long-lived, they may be found nearly the whole summer long; the larva feeds upon parsley and other umbelliferæ..
2. PAPILIO TROILUS Linn. Skirts of woods; not common; there are probably two broods of this species, appearing about the same time as the preceding; they are found from June to October; larva feeds on Laurus, Sassafras, Lilac.
3. PAPILIO TURNUS Linn. Upon flowers, especially on Lilacs; very common in the northern and more elevated portions of New England; one brood each year, imago June, July; larva feeds on the apple-tree.
4. PAPILIO PHILENOR Drury. A few specimens have been taken at Cambridge, Mass., about the Botanical Gardens, undoubtedly introduced with some southern plants, and they have also been taken once or twice in other parts of Eastern Massachusetts; last of September.
5. PIERIS OLERACEA Boisd. *Pontia oleracea* Harr. In gardens and open shady spots; common only in the northern and elevated parts of New England; there are two broods of this species, the first in May, the second in July; larva feeds on turnips and cabbages.
6. COLIAS PHILODICE Godt. Everywhere in open places; the most common species of butterfly, but most abundant in the warmer parts of New England; there are two broods of this species, the first appearing in April and May, the second late in July; the butterflies are to be seen all summer though very rarely in June; larva feeds on clover.
7. TERIAS LISA Boisd. About bushes; found only and very rarely in the southernmost portions; September.
8. TERIAS DELIA Boisd. Same as *T. Lisa.*
9. CHRYSOPHANUS AMERICANA D'Urban, Canad. Nat. v: 246. *Lycæna americana* Harr. Fields, on clover, and in highways; very abundant everywhere; there are I think three broods each year, the butterflies of the first appea ing in the early spring, April and May, of the second late in June and early July, and of the third after the middle of August; larva feeds on sorrel.

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10. CHRYSOPHANUS THOE Westw. Meadows; quite rare; September.

11. CHRYSOPHANUS EPIXANTHE Westw. *Lycaena Epixanthe* Harr. Meadows; very rare; July.

12. POLYOMMATUS PORSENNA nov. sp. Above brownish black. *Primaries* with two connected, large, triangular, fulvous spots, the inner one largest with its apex at the base of the wing, and divided from the apex more than half way down the middle by a black club-shaped dash; the outer one with its base towards the lower half of outer border, notched in the middle of the side toward the apex of the wing. *Secondaries* having the outer third, except at outer angles, fulvous, with a submarginal series of unequal brownish spots, largest toward inner angle. Beneath cinnamon-brown. *Primaries* with the disk yellowish, a subcostal series of four reddish-brown spots bordered with white, increasing in size outwardly, the outermost near the apex and triple, two large brown spots near the anal angle, and a clubbed streak of same color, corresponding in position to that above, but much broader. *Secondaries* entirely covered with spots like the central ones of the subcostal series of primaries. Expanse of wings 1 1-3 in.

This species is exceedingly closely allied to *P. Tarquinius* Boisd. and Lec. from which it may readily be distinguished by its range and by having many of the spots of the under surface larger and more distinct; the condition of my specimens of *P. Tarquinius* will not now allow of a detailed comparison. I have seen only males of either; the male of *P. Tarquinius* is figured by Abbot in Boisduval and Leconte, and that of *P. Porsenna* by Hewitson in Doubleday and Westwood's Genera; in some unpublished drawings of Abbot's in the Library of the late Dr. Harris, now in possesion of the Boston Society of Natural History, is figured the female also of *P. Tarquinius*; it differs from the male in wanting the band along costal border, with the exception of a narrow stripe on the sub-costal, having a small square spot just beyond its termination near the middle of the wing, and a transverse series of dots below the latter; the band on the outer border is also broken up into a large square apical spot, an interrupted, rather narrow, marginal border,

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and a rather large dash at the outer angle along the inner border; on secondaries the marginal series of small spots is wanting, save the central one; the upper surface only is figured.

Having taken *P. Tarquinius* only in Florida, and knowing of it only from the extreme south, I was much surprised when this spring, specimens of a butterfly were shown me by Mr. Packard from Aroostook Co., Me. and by Mr. Verrill from Norway, Me., which bore a most striking resemblance to *P. Tarquinius;* subsequently and since this paper was written, I have heard of it from other northern localities and have myself taken it; Mr. Emory of Springfield took it near Manchester, N. H.; specimens are in the Museum of Comparative Zoology from the White Mountains, a little north of which, at Berlin Falls, I have taken it and have seen a specimen from near the same place collected by Mr. Treat; the British Museum specimen comes from Nova Scotia, and latterly (see Canadian Naturalist, vii: 398) it was exhibited at a gathering of entomologists by Mr. Billings, of Prescott, Canada West. My specimens were taken Aug. 13. (This paragraph was appended after the presentation of the paper to the Institute.)

Porsenna was an ally of the Tarquinians on their expulsion from Rome.

13. Lycæna neglecta Edw. *Polyommatus pseudargiolus* Harr. (Fig. 105). About thickets; rare; June, July.
14. Lycæna Lucia Westw. *Polyommatus Lucia* Harr. (Fig. 106). About thickets and in shaded places; very rare; found mostly in the elevated and more northern regions; April, May, June.
15. Lycæna Comyntas Westw. *Polyommatus Comyntas* Harr. Road-sides and pastures by woods; quite common; there are at least two broods of this; it appears first very early in the spring, in April; I have taken it early in June, and it is common from the middle of July to the middle of September.
16. Thecla Falacer Harr. Near thickets; not common; last of July and first of August; larva feeds on Hawthorn.
17. Thecla strigosa Harr. Near thickets; very rare; early August.
18. Thecla humuli Harr. About bushes and hop-vines; the most common of the Theclas; July, August; larva feeds on the hop.

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19. THECLA AUBURNIANA Harr. On flowers near woods; rather rare; early May and early August.

20. THECLA NIPHON Boisd. and Lec. On flowers of Gnaphalium, by shady road-sides; rare; early May.

21. THECLA MOPSUS Harr. *Strymon Mopsus* Hubn. very rare, in southern portions only.

22. THECLA AUGUSTUS Kirby. By thickets; rarely found except in the northern portions where it is common; May.

23. DANAIS ERIPPUS Doubl. *Danais Archippus* Harr. On flowers in meadows; rather common; it makes its appearance about the last of July and continues through the following month; larva feeds on Asclepias.

24. LIMENITIS MISSIPPUS Harr. in Proc. Bost. Soc. Nat. Hist. vii: 189. *Nymphalis Dissippe* Harr. in Treatise. Fields; common; June and September; larva feeds on willow and poplar.

25. LIMENITIS URSULA Boisd. and Lec. *Nymphalis Ephestion* Harr. Skirts of woods; rather rare, only in southern portions; two broods a year, about the last of June, and in September; larva feeds on scrub-oak.

26. LIMENITIS ARTHEMIS Boisd. and Lec. *Nymphalis Arthemis* Harr. Skirts of woods and shady road-sides; abundant in the northern and elevated regions only; June and early July.

27. ARGYNNIS IDALIA Godt. Open fields; not abundant, most common southwardly; last half of July and early August.

28. ARGYNNIS CYBELE Godt. I do not know that this species is found in New-England, but I have seen it from the Hudson River, and do not doubt it will be found in Connecticut.

29. ARGYNNIS ATLANTIS Edw. Proc. Philad. Acad. Nat. Sc. 1862: 54. Road-sides and open fields; found only in the elevated and northern portions of New-England; very abundant in the valleys about the White Mountains, N.H.; last of July and early August; larva said to feed on the Violaceæ.

30. ARGYNNIS APHRODITE Fabr. Open fields; very abundant, about flowers, everywhere except in the most elevated and northern portions; it is not found about the White Mountains; July, August.

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31. ARGYNNIS MYRINA Godt. Moist meadows; not very common; June, August and September.

32. ARGYNNIS MONTINUS nov. sp. Very similar to *A. Chariclea* Ochs. Above much like *A. Myrina* with fewer black markings at the base of both wings. Below, *Primaries* without any silvery sagittate spots, the markings of the upper surface faintly repeated. *Secondaries* deep cinnamon-red; a broad faint submesial band, bordered with interrupted black lines, of whitish ochraceous scales, deepest next the black border and conspicuous only between the costal and subcostal and between the median and submedian nervures, elsewhere obsolete; there is a submarginal row of faint silvery lozenge-shaped spots, largest towards the outer angle, between which and the mesial band is an arcuate series of round cinnamon-red spots in a field of mingled ochraceous and cinnamon-red scales, forming a band with serrated border. Expanse of wings 1 3-4 in. The males and females do not differ.
This species is found only on the lower half of the barren summits of the White Mountains, N. H. I have taken only a few specimens from July 21st to Aug. 18th around bushes and in the road. It does not seem to be abundant.

33. ARGYNNIS BELLONA Godt. Damp meadows; common; last of May and from last of July through August.

34. EUPTOIETA CLAUDIA Doubl. A single specimen of this has been taken by Mr. Shurtleff at Leomister, Mass, in the middle of summer.

35. MELITÆA ŒNONE nov. sp. Above pale fulvous with blackish brown markings. *Primaries*; basal half of costal border black, with a broad arcuate transverse band just beyond the cell between the costal border and median nervure, met at its inner border by a smaller triangular patch having its base on the internal border; the space thus enclosed at the base of the wing broken up into small spots by irregularly disposed black lines; a very broad marginal band, leaving only a comparatively narrow fulvous band in the middle of the upper half of the wing; an arcuate row of small equidistant pale fulvous spots parallel to the apical half of outer margin; between the upper branches of the median a submarginal pale fulvous sagittate spot, with a dot just below it; a narrow dusky band

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crosses the spaces on either side of the lowest branch of median, parallel and close to the inner border of marginal band. *Secondaries*; basal half dusky with irregular small fulvous spots; space between costal and subcostal dusky; marginal dusky border not very broad, with a marginal series of scarcely arcuated, obsolete, orange lunules, bordered with black, and also a submarginal series of obsolete pale fulvous crescents, generally most distinct between uppermost branches of subcostal and median nervures; next the marginal band a slightly arcuate series of large round black spots, those between branches of median, pupilled with pale fulvous; the central fulvous band cut in two by an arcuate transverse dusky line.

Beneath. *Primaries* much more pale fulvous than above, with the principal markings of the upper surface faintly repeated, but with the subapical dots much larger, and with the addition of a narrow marginal orange band bordered with black and three apical pearly white, generally confluent, spots. *Secondaries* pale straw yellow, with a basal band of confluent pearly white spots, next to which is a broad yellowish brown transverse band, darkest externally; the margin, except at the outer angle, is broadly blackish brown, with the submarginal row of round spots of upper surface repeated and margined with orange; next the margin is a narrow orange band like that of primaries, resting upon which is a series of pearly white lunules, the two outer of which, with that between uppermost branches of median, are very large, the others inconspicuous; the median broad pale yellowish band is divided into two portions by an undulate ferruginous line; fringe of both wings white interrupted with black. Expanse of wings ♂1 3-5 in, ♀1 4-5 in.

Quite rare; I have only seen a few specimens from Lenox and Williamstown, Mass., and from Norway, Me., Mr. Verrill.

36. Melitæa Harrisii nov. sp. *Melitæa Ismeria?* Harr. (not *M. Ismeria* Boisd. and Lec.) May be quickly distinguished from *M. Oenone* by the under surface of secondaries, which are cinnamon-red with bands and spots of white margined with black, as follows: a broad mesial band cut across externally with black; a basal transverse

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spot, and midway between this and mesial band a narrower interrupted band of spots; a spot near the extremity of the cell, and a submarginal row of nearly uniform lunules.

Fields; I have only seen two or three specimens, from Norway, Maine, Mr. S. I. Smith, in the Museum of Comparative Zoology; from Pittsfield, N. H., Mr. Treat; and from Sutton and Princeton, Mass.; mine was taken in July or August.

37. MELITÆA THAROS Boisd. and Lec. *Melitæa Pharos* Harr. Meadows and pastures; very abundant; June and early July, late August and September.

38. MELITÆA PHÆTON Boisd. and Lec. Low grounds and open fields; quite rare; June; I have taken the caterpillar, just ready to change, upon the Barberry in the middle of May; does the larva hibernate?

39. PYRAMEIS CARDUI Doubl. *Cynthia Cardui* Harr. On thistles; common; May and again in July, August and September; larva feeds on thistle and sunflower.

40. PYRAMEIS HUNTERA Doubl. *Cynthia Huntera* Harr. Same as *P. Cardui.*

41. PYRAMEIS ATALANTA Hubn. *Cynthia Atalanta* Harr. Roadsides; abundant at times; May, August and September; larva feeds on the nettle.

42. JUNONIA CŒNIA Hubn. *Cynthia Lavinia* Harr. Dr. Harris took one specimen in a meadow in Milton, Mass., on August 19; I have taken a single damaged specimen in a garden on Cape Cod in early September.

43. VANESSA ANTIOPA Ochs. Everywhere; very abundant; hybernate in its perfect state and so appears on warm days in early spring and is seen from then till June and again after the middle of August; larva feeds in company on willows, poplar, and balm of Gilead, stripping them bare.

44. VANESSA J-ALBUM Boisd. and Lec. Open woods; rather rare, most abundant in the northern parts; August, September.

45. VANESSA MILBERTI Godt. Roadsides; rather rare, more common in northerly portions; May, July, August; larva feeds on nettles.

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46. GRAPTA INTERRAGATIONIS Doubl. *Vanessa interragationis* Harr. Roadsides; not abundant, more common southwardly; May, August, September, October.

47. GRAPTA C-ARGENTEUM Kirby. *Vanessa Progne* Harr. non Cramer. Roads through woods; rather common, the most abundant of the Graptas throughout New England; July, August; larva feeds on the elm.

I have taken four specimens of a *Grapta* at the White Mountains from the valleys to the summit, which may possibly belong to this species, but seems to indicate the presence of a new species; it is fully as small as, if not smaller than, *G. C-argenteum*, its upper surface is like that of *G. Faunus*, while its under surface is more like *G. C-argenteum*, but differs from that in having the broad ashy band quite hoary, nearly white, and extending also with equal distinctness across the secondaries; the discal spot of secondaries is a white L with both limbs nearly equal similar and straight.

48. GRAPTA COMMA Doubl. *Vanessa comma* Harr. Roads through woods; rather rare and appears to be found mainly in the southern portions; May, July, August, September; larva feeds on the hop and the elm.

49. GRAPTA FAUNUS Edw. Proc. Philad. Acad. Nat. Sc. 1862: 222. Roads through woods; found only in the northernmost and most elevated portions of New-England, extremely abundant among the White Mountains; August, September, to middle of October.

50. CHIONOBAS SEMIDEA. *Hipparchia semidea* Harr. Found only upon the upper half of the barren summits of the White Mountains in July and early August, very abundant; larva feeds upon lichens; chrysalis found under stones.

51. SATYRUS ALOPE Boisd. and Lec. *Hipparchia Alope* Harr. Roadsides and hedges; abundant; July and August.

52. SATYRUS PORTLANDIA Boisd. and Lec. I have seen but a single specimen from New-England.

53. HIPPARCHIA BOISDUVALII Harr. Pastures; rather rare; late July.

54. NEONYMPHA EURYTRIS Westw. *Hipparchia Eurytris*

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Harr. About bushes, in shady places; not common; early June and late July.

55. LIBYTHEA BACHMANII Kirtl. A single specimen of this is preserved in Harris' Cabinet marked with his own handwriting "in garden, June 24."

56. HETEROPTERUS MARGINATUS Harr. Low meadows; abundant; July, August.

57. NISONIADES JUVENALIS Westw. *Thanaos Juvenalis* Harr. Meadows; quite rare, more abundant southwardly; April, May, August.

58. NISONIADES PERSIUS nov. sp. This species is spoken of by Harris as a local variety of *N. Juvenalis*, but it is a distinct species; the distinctions mentioned by Harris in the spots on the wings are not persistent, but it differs from *N. Juvenalis* in its smaller size, and in the fact that the male and female are exactly alike in the markings, while in *N. Juvenalis*, the female differs from the male in having very much larger spots and in the marked ashy-grey tints of the apical half of both primaries and secondaries above, differing so much as readily to be taken for a distinct species. *N. Persius* has exactly the general appearance in coloration of the male of *N. Juvenalis;* the distinction of male and female is marked in Abbott's figures. The description of larva and chrysalis in Harris' Insects apply to this insect and not to *N. Juvenalis*, as specimens in his cabinet show. Meadows; somewhat common; early August.

59. NISONIADES BRIZO Westw. *Thanaos Brizo* Harr. Meadows; rare; May, July.

60. NISONIADES CATULLUS Westw. Very rare, found only in southern portions.

61. EUDAMUS TITYRUS Boisd. and Lec. About gardens; not often abundant; June, July; larva feeds on the locust.

62. EUDAMUS LYCIDAS Boisd. and Lec. I have seen but a single specimen, obtained by Mr. Plympton in Waltham, Mass., on the flowers of Phlox.

63. EUDAMUS BATHYLLUS Boisd. and Lec. Fields; abundant; June, July.

64. HESPERIA METACOMET Harr. Fields; somewhat rare; July.

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65. HESPERIA MASSASOIT nov. sp. ♂ Above very dark-brown with a mulberry lustre, having no markings except occasionally a faint small yellowish spot or two on middle of secondaries, fringe slightly paler, yellowish around the inner angle of secondaries.

Beneath: *Primaries* hardly so dark as above, with reddish-yellow scales scattered along the costal border, and on the outer border, especially toward the apex; two very small spots of same color, about midway between extremity of cell and apex of wing, with two large ones at the middle of the wing, the inner a little lower than the outer: *Secondaries* dark-brown with profusely scattered reddish-yellow scales, especially toward the inner angle; the central portion of the wing is entirely taken up by a large sulphur-yellow spot of irregular shape, formed of a straight broad band, extending between the subcostal and median nervures, nearly to the hind border, cut across by an incurved line of reddish-yellow scales just below the divarication of the subcostal, and crossed by a transverse broad band, just beyond the middle of the wing, extending from costal to submedian nervures, cut across by the reddish-yellow scales following the nervules, and bent somewhat upon either side of the first band.

♀ Differs from ♂ only in having the markings of the under surface of the primaries repeated above, and a faint transverse band of distant reddish-yellow spots across the middle of secondaries. Expanse of wings 1.1—1.4 in. Very rare; I have seen it only from Carver, Mass., Mr. Shurtleff, Conn., Mr. Edwards, and New-England, Museum of Comp. Zoology.

66. HESPERIA HOBOMOK Harr. Open field; quite common; June and early in July.

67. HESPERIA POCAHONTAS nov. sp. Above dark blackish-brown with yellowish-white markings on primaries disposed as those in *H. Metea*, but considerably larger; secondaries with the markings of the under surface faintly repeated.

Beneath: *Primaries* with a large basal black spot; beyond it a little past the middle a very broad whitish ochraceous band from the sub-costal nervure to inner border; above it and along costal border ochraceous mixed with reddish-

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brown scales, with the sub-apical whitish spots of the upper surface repeated; between them and the tip a reddish-brown patch; the outer margin rather broadly bordered with grayish scales. *Secondaries* reddish-brown with a very broad transverse greyish band of whitish mixed with reddish-brown scales, placed a little beyond the middle, with somewhat irregular borders, expanding between the sub-costal and the median, having much the appearance of that in *H. Hobomok*; the outer margin rather broadly bordered with greyish scales like that of primaries, deeper in tint than the transverse band; between the costal and sub-costal, midway between its union with the subcostal and the broad band, a small spot of greyish scales; fringe of both wings ochraceous or dark brown. Expanse of wings nearly 1 1-2 in. I have only seen a few specimens taken in Mass. and Conn. by Mr. Norton; very rare.

68. HESPERIA LEONARDUS Harr. Appears to be quite an uncommon species, but I have taken it abundantly on Cape Cod in September.

69. HESPERIA MYSTIC. *Pamphila Mystic* Edwards Mss. ♂ Above: *Primaries*; the outer border broadly margined with dark brown, the inner edge of the margin excavated between the subcostal and median nervures; the rest of the wing dark golden-yellow, except a dark-brown patch between the sub-costal and median a little beyond the middle, the griminess of the base of the wing, and the velvety black dash, which here extends from the sub-apical patch to the sub-median nervure, at about two-fifths the distance from the base; it is nearly straight, but formed of two shallow crescents, the innermost occupying the space between the median and sub-median, each broadly bordered externally with a blackish-brown roundish spot, the two partially or wholly confluent. *Secondaries*; the entire border broadly margined with dark-brown, the central portions dark golden-yellow traversed by dark nervures, and transversely by a narrow dusky medial band.

Beneath ochraceous with the markings of the upper surface duskily repeated and in addition a broad blackish patch along the basal half of inner border of primaries,

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and a dusky patch between the basal half of the space between median and submedian on secondaries. The fringe is pale brown, paler on secondaries, and the outer border of both wings is narrowly edged with black.

♀ differs from ♂ in following particulars: *Primaries;* the whole costal border is broadly margined with dark-brown up to the sub-apical patch with which it is usually confluent, and in the place of the black dash, is a broad dark-brown spot occupying all the basal half of the wing below the median nervure, and becoming confluent, with the sub-apical patch at its upper extremity. *Secondaries;* the medial band is broad instead of narrow, leaving but a small yellowish spot near the base. Beneath the markings are repeated with rather more distinctness than in the ♂. Expanse of wings ♂ 1 1-4 in. ♀ 1 2-5 in.

The ♂ differs from that of *H. Sassacus* in the spots bordering the black dash of primaries, and in their confluence with the sub-apical patch, which is itself broader, as well as in the transverse band of secondaries. The ♀ differs from that of *H. Sassacus* in the greater extent of the black patches on the primaries and their confluence with the sub-apical patch, and also in the broad transverse band of secondaries wholly wanting in *H. Sassacus*. Open fields; common from middle of June to middle of August; from White Mountains to Maryland.

70. HESPERIA SASSACUS Harr. ♂ differs from the ♀ in the velvety black dash which takes the place of the central black stripe; this is very narrow, very slightly curved, extends from the last divarication of the median, along the lower side of that nervure, across the space between it and the sub-median to the latter, terminating at a point about one-third the distance from the base; it is narrowly edged below with large lustrous brown scales, but has no spots bordering it, as in *H. incerta.* Harris described only the ♀. Open fields; quite rare, especially the females; June.

71. HESPERIA WINGINA nov. sp. ♂ Above: *Primaries* bright tawny-yellow with a broad maroon border extended inwards duskily between the nervures; a dark-brown sometimes dusky patch between sub-costal and median, extending from just above last divarication of median half way to the border; the oblique dash straight, extending

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from last divarication of the median to the sub-median, two-fifths the distance from the base; it is formed of a narrow patch, pointed outside rounded inside, of dust-colored scales, edged above narrowly and below very narrowly with crowded black scales, with a broad black border below of scales of the usual distance apart; *Secondaries* dark-brown, the whole central portion strongly tinged with tawny.

Beneath: *Primaries* with the markings of the upper surface, except the oblique dash, repeated, and an addition of a large dark patch on the basal half of inner border. *Secondaries* sulphur-yellow, the outer margin with scattered brownish scales, a roundish brown spot in centre, a large triangular one near the base of the costal border, and two rather large submarginal squarish patches sometimes confluent, one at the extremity of the subcostal, and the other near the tip of the median nervules. Fringe of outer border of both wings tawny mixed with dark brown on the upper half of primaries.

♀ Above uniform dark brown with dull yellowish-white spots on the primaries like those in ♀ of *H. Monoco* and *H. Massasoit.*

Beneath: *Primaries* dark brown with the markings of upper surface repeated and the costal border and upper portion of outer border edged with dark olivaceous scales. *Secondaries* as in the ♂ with dull dark olivaceous scales in the place of the sulphur-yellow, with the spots and patches of blackish-brown more or less mixed with olivaceous. Expanse of wings ♂ 1 1-3 in. ♀ 1 2-5 in.

Rare and only found in southern portions of N. England; abundant South.

72. HESPERIA WAMSUTTA Harr. *Hesperia Peckius* Harr. (not *H. Peckius* Kirby) Open fields, pathways and highways; the most common species of Hesperia; found from Canada to Maryland; June, July, August.

73. HESPERIA EGEREMET. *Hesperia Otho* Boisd. and Lec. Pl. 77 (not *Papilio Otho* Abb. and Smith.)

♂ Above dark glossy brown; *Primaries* with a velvety-black oblong oval patch .08 in. in length on the hind border of median, separated from a black spot, two-fifths as large between the median and submedian, by a patch

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of large brown scales, which also border the spot exteriorly and encroach upon it; beyond and bordering the oval patch is a quadrate yellow spot, half way between which and the apex, approaching the costal border is a small divided yellow spot; there are a few yellow hairs along the inner border. *Secondaries* with a few yellow hairs, giving a dull tint over the whole disk; the fringe of both wings is pale brown.

Beneath dark brown slightly dusted with ochraceous scales. *Primaries*; the yellow spots of upper surface repeated; a few yellowish scales along basal half of costal border. *Secondaries* with a faint pale-yellowish narrow transverse band just beyond the middle, scarcely reaching either border.

♀ Differs from the ♂ as usual, and also in wanting the spot beyond the black patch, which is replaced by two others, the smaller between the last two branches of the median at their base, the other on the space below a little more towards the base; the spots are brighter than in the male and the secondaries are more nearly uniform; beneath the spots of the primaries are repeated and the secondaries are as in the male—Expanse of wings 1 1-4 in. ♂ Mass. F. G. Sanborn; ♂ ♀ Georgia, Harris' Collection from Mr. Abbot and Dr. Oemler; ♂ Western States, Mus. Comp. Zool.; very rare in N. England; July.

74. Hesperia Manataaqua. *Hesperia cernes* Harr. Ins. 3rd Ed. 316 (not *H. cernes* Boisd and Lec.)

The two specimens, one from Massachusetts and the other from Georgia, from which Dr. Harris drew up the description of *H. cernes* belong apparently to two representative species, differing from one another (they are both males) in the oblique black dash of the primaries; they can neither of them be referred to *H. cernes* Boisd. and Lec., which is more nearly allied to the succeeding species, though of the size of these; the species from Georgia appears to be yet undescribed; to the one from Massachusetts may be given the name I have proposed above; the female differs from the male only in wanting the oblique black dash of primaries, and in the presence of two rather large squarish yellowish spots, at the outer extremity of where the oblique dash would be if present, between the

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median nervules, the lower one largest and not so near the outer margin. Very rare; July.

75. HESPERIA AHATON Harr. This species is certainly very closely allied to *H. cernes* Boisd. and Lec. but is invariably smaller than their representation of it, and in the absence of specimens from the South, I shall at present presume that, as is the case with the preceding species, there is a southern representative of this species, which has been figured by Boisduval and Leconte under the name of *H. cernes*. The female of this species differs from its male, not only as Harris has stated, but also in having the costal band very pale-tawny, often obsolete, and the spots on the primaries very pale, almost whitish.

Open fields; males quite common, females very rare; June and August.

76. HESPERIA ONEKO nov. sp. Above dark-brown, tinged slightly with ochraceous on the secondaries. *Primaries* with a strongly arcuated band of small ochraceous spots, starting from costal border at a little more than three-fourths of the distance from the base, bent inward towards the middle, terminating a little below centre; two small spots at the tip of the cell. *Secondaries* without markings.

Beneath dark-brown, with a slight bluish tinge on secondaries. *Primaries* with the markings of the upper surface distinctly repeated. *Secondaries* with a rather narrow transverse whitish-ochraceous band a little beyond the middle, bent in the middle of its course, with an indistinct transverse line sub-parallel to it, midway between it and the base. Expanse of wings 1 1-8 in. Very rare; I know it only from Connecticut, Mr. Norton.

77. HESPERIA HEGON nov. sp. Above and beneath uniform dull dark-brown, with faint white markings on both surfaces of primaries situated as in *H. Oneko;* on under surface of secondaries, a submarginal series of small indistinct whitish spots, a small white spot in the centre, and another between the costal and subcostal nervures, midway between the base and the submarginal band. Expanse of wings nearly 1 inch.

I have seen but a single specimen, a female taken by myself at the White Mountains in the latter part of July.

78. HESPERIA SAMOSET nov. sp. Above dark-brown with

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a few ochraceous scales especially at base of primaries and on disk of secondaries. *Primaries* with three small yellowish spots one above the other on costal border a little more than three-fourths the distance from the base; below these and a little further removed from the outer border than they, between the uppermost branches of the median, a small spot; in the space below, situated near the base, another small spot or slender oblique line, and sometimes another below it between median and submedian; a double spot at the end of the cell.

Beneath dark-brown with profusely scattered pale-yellowish scales most abundant toward the outer margin; a very delicate purplish reflection, especially on secondaries. *Primaries* with the markings of the upper surface repeated. *Secondaries* with a narrow transverse pale yellowish band, two-thirds the distance from the base, nearest the outer margin at the lowest band of subcostal, where it is bent at right angles, and whence towards the costal border it is interrupted; a small spot in centre and another between costal and subcostal midway between the base and transverse band; fringe of both wings pale yellowish interrupted with dark-brown, most distinct upon primaries. Expanse of wings fully 1 inch. Very rare; I have seen two specimens from Mass. and N.H.

79. HESPERIA METEA nov. sp. Above dark-brown tinged with ochraceous, especially on secondaries. *Primaries* with the following white markings; two small spots at the extremity of the cell; three small white spots one above the other on the costal border, a little more than three-fourths of the distance from the base; below these, and half way between them and the outer border, one above the other, two more small ones; placed successively a little nearer the base than the last, two others somewhat larger between the branches of the median. *Secondaries* uniform in tint, with a faint ochraceous repetition of the markings beneath; the outer border of both wings narrowly edged with black; the fringe slightly paler than the upper surface.

Beneath dark-brown, on the secondaries approaching to black, with some greyish scales towards outer border. *Primaries* with the markings of the upper surface repeated with greater distinctness; a large pale-brown spot at outer

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angle. *Secondaries* with a band formed of squarish greyish-white spots between the nervures, starting at the costal at two-thirds the distance from the base, nearly reaching the outer border in the space between subcostal and median, thence bent toward the inner border at a very little less than a right angle, terminating at the submedian. Expanse of wings, 1 1-3 in. I know this species only by a single female from Conn., received from Mr. Norton.

80. HESPERIA MONOCO nov. sp. Uniform dark-brown above and beneath, the secondaries with no markings. ♂ Primaries with a narrow, slightly sinuate black dash, taking a general direction from the apex to the middle of the inner border, commencing at the median at its second divarication and barely attaining the submedian; there are three small white or pellucid spots, one above the other, between the ultimate branches of the subcostal, and another small one just beyond the outer tip of the black dash. ♀ Primaries the same as the ♂, except in having the black dash replaced by a whitish spot, between the first two branches of the median, below and a little within the smaller single one. The pale markings in both sexes are repeated beneath. Expanse of wings 1 1-3 in. Very rare; only in southern portions; Conn. Mr. Norton, and Mass.

81. HESPERIA PANOQUIN nov. sp. Above dark-brown tinged with golden-yellow on the disk. *Primaries* more pointed at the tip than in any other species; a series of four small equidistant yellowish-white spots, commencing near the apex, parallel with the costal border, and terminating with one larger than the rest between the earliest branches of the median near the divarication; half way between the second and the costal border is a small nervure-divided one.

Beneath with no tinge of yellow. *Primaries* with the markings of the upper surface repeated but with scarcely any yellow tinge, and in addition a faint white spot near the middle of the space between the median and submedian. *Secondaries* with a small white spot between the first two branches of subcostal, three-fourths the distance from the base of the wing, and a narrow pearly-white streak between the next two branches, on the outer half

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of the wing, not reaching the border, and a small faint white spot in the middle of the space between median and submedian. Expanse of wings 1 1-3 in. The pointedness of the apex of the primaries would lead one to suppose this a male, but it has no black dash on the primaries; the abdomens of the only specimens I have seen chance to be broken. Very rare; I have only seen two specimens from Conn., received from Mr. Norton.

Mr. F. W. Putnam read a letter recently received from Prof. M. Miles, of Lansing, Mich., accompanying a box containing a large collection of fishes, reptiles, &c., from that state, and expressing a wish to continue the exchange of specimens in natural history. A vote of thanks was passed to Mr. Miles for the above collection and the curators of the department of Natural History were requested to continue the exchanges.

Prof. A. Crosby expressed the interest and pleasure he had experienced in listening to the valuable remarks which had been offered during the evening, and on his motion,

Voted unanimously, that the thanks of the Institute be tendered to Messrs. Verrill and Scudder for the highly valuable remarks and communications presented this evening, and the papers be referred to the Publication Committee.

Donations were announced from the following:

To the Library—from J. Fiske Allen; Thomas Pinnock; Misses King; George Nichols; E. M. Stone of Providence, R. I.; M. A. Stickney; Mrs. Mary E. Wheatland; Montreal Society of Natural History; Wm. Brown; Trustees Public Library of Boston; Canadian Institute at Toronto; Mrs. Geo. H. Chase; C. B. Richardson of New York; M. Miles of Lansing, Mich.; Geo. C. Chase; H. M. Brooks; John G. Felt; and John Robinson.

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To the Cabinets—from S. Q. Felt; Geo. P. Ives; Abiel H. Wardwell; Stephen Cloutman; John Robinson; Chas. H. Manning; M. Miles, Lansing, Mich.; A. C. Goodell, Jr.

Adjourned.

Monday, March 24, 1862.

Meeting this evening at 7 1-2 o'clock. In the absence of the President and Vice Presidents, A. C. Goodell Jr., was called to preside.

Records of the preceding meeting read.

Letters were announced from Chas. W. Felt; S. Jillson of Feltonville; C. H. Manning; and J. Wingate Thornton of Boston.

Rev. J. B. FELT read a valuable communication on the early piracies on this coast, with a particular reference to those of Capt. William Kidd. (See Historical Collections of the Institute, vol. iv. page 30.)

Remarks were offered in connexion with this subject, by the chair, Messrs. C. C. Beaman, G. D. Phippen and other members.

On motion of Mr. Phippen it was

Voted, That the thanks of the Institute be tendered to Mr. Felt, for the communication read this evening, and that a copy be placed at the disposal of the Publication Committee.

Donations were announced from the following:—

To the Library—from N. J. Lord, Montreal Society of Natural History; Boston Society of Natural History; Museum of Comparative Zoology at Cambridge; W. R. Cloutman; Chicago Historical Society; J. Wingate Thornton of Boston; George F. Read, James B. Curwen.

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To the Cabinet—from John C. Chadwick; William L. Welch; Samuel A. Greene; Charles W. Felt; E. D. Ropes; O. H. Saunders.

Adjourned.

Monday, April 7, 1862.

Meeting this evening at 8 o'clock; in the absence of the President, George D. Phippen was called to preside.

Records of preceding meeting read.

Letters were announced from the Trustees of the New York State Library; American Geographical and Statistical Society; Horace Binney of Philadelphia; Historical Society of Pennsylvania; Maine Historical Society; Connecticut Historical Society; F. S. Pease of Albany; Solomon Lincoln of Hingham; Jonathan Pearson of Schenectady N. Y.; C. M. Tracy of Lynn; A. E. Verrill of Norway, Me.

C. M. Tracy of Lynn gave an interesting and instructive lecture on *Phyllotaxis*—the arrangement of the leaves on the stem, the uses of the leaf in the vegetable economy—the variety of the forms in the different plants, mode of development, &c.

Remarks upon the lecture were offered by the chair, Rev. C. C. Beaman, and others.

On motion of Mr. Beaman, the thanks of the Institute were tendered to Mr. Tracy for the lecture, which he has presented to our consideration this evening.

Donations were announced as follows:

To the Library—from James Cook of San Francisco; Cincinnati Mercantile Library Association; Philadelphia Academy of Natural Science; New York Lyceum of Natural History; Jonathan Pearson of Schenectady, N.Y.

To the Cabinets—from N. Ingersoll; George Cassey of

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South Danvers; W. L. Welch; Charles H. Manning; Salem Volunteers in the 21st Reg., Mass. Vols., by A. F. Walcott; O. H. Saunders.

Adjourned.

Friday, April 25, 1862.

Meeting this evening at 8 o'clock, the President in the chair.

Records of preceeding meeting read.

Letters were announced from Samuel A. Green, Surgeon 24th Reg. Mass. Vols.; F. H. Lee of 23d Mass. Vols.; and A. F. Walcott of 21st Mass. Vols.; W. Barry, Sec'y Chicago Historical Society; S. H. Grant, Lib. N. Y. Mercantile Library Association; Solomon Lincoln of Hingham; E. S. Waters.

A. C. Goodell Jr., read a paper on the history of the Puritans, with especial reference to the distinction between the Separatists, or Independents of Plymouth Colony, and the Non-conformists of Massachusetts Bay.

Beginning with a brief review of the progress of the Anglican reformation up to the time of the Marian persecutions, he described the difficulties in the church of the exiles at Frankfort, in 1554, as the origin of Puritanism in the Church of England; though the name Puritan is not known to have been used before 1564.

He then traced the origin of the Old Separatists to the year 1566; of the Brownists to the year 1582; of the Semi-Separatists to the year 1602—from whom sprang the Plymouth Colonists, or "Pilgrim Fathers;"—and of the Non-conformists to the year 1559, of which class were the Puritans of Massachusetts Bay.

In concluslon, he entered into an examination of the doctrines and of the ecclesiastical systems of the two colonies,

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and concluded that the difference between them was chiefly in their respective origins and ecclesiastical traditions, and not in any essential variance respecting matters of doctrine or discipline, which will account for the rapid and complete union of the two colonies in all ecclesiastical matters, and for the harmony with which both labored to build up a church system which was peculiar, and which combined in some measure the characteristics of the of the politics of the three great classes of dissenters; the Presbyterians, the Erastians, and the Independents of Old England. (See Hist. Coll. of Institute, iv: 145.)

F. W. Putnam gave a brief outline of the Animal Kingdom, with especial reference to the principal elements that mark the Branch, the Class, the Order, the Family, the Genus, the Species, and Variety. He also explained the mode of instruction in Zoology adopted by Prof. Agassiz at his school in Cambridge, and proposed to adopt a similar course, so far as circumstances will admit, with the class of young pupils which he was then about forming at the rooms of the Essex Institute.

The chair presented to the society the lancet case formerly belonging to the late Dr. Micajah Sawyer of Newburyport, in behalf of Dr. Stevens of New York,—announcing the same with appropriate remarks on the character of Dr. Sawyer and his distinguished patient the Rev. George Whitfield.

Donations were announced as follows:—

To the Library—from Samuel G. Drake of Boston; Peabody Institute of South Danvers; American Philosophical Society; Canadian Institute at Toronto; H. M. Brooks; J. J. Rider; Miss Lydia Pope; Geo. F. Read; N. Silsbee; J. Perley, Jr.; L. Bemis of Boston; H. F. Shepard; R. H. Wheatland.

To the Cabinets—Chas. B. Elwell; C. Cooke; W. L.

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Welch; Henry Merritt; George Cassey of South Danvers; O. H. Saunders; A. H. Stevens of New York.

On motion of Rev. E. B. Willson the thanks of the Institute were tendered to Messrs. Goodell and Putnam for their interesting remarks.

Adjourned.

Wednesday, May 14, 1862.

Annual meeting, this day, at the rooms, Plummer Hall, at 3 P.M., Vice President, S. P. Fowler in the chair.

Records of the preceding annual meeting read.

Donations since the meeting of the 25th ult. were announced from the following:—

To the Library—from S. G. Wheatland; J. B. Alley, M. C.; William Briggs; John L. Sibley of Cambridge; E. B. Willson; J. J. Rider; Mrs. G. H. Chase; Charles F. Barnard of Boston.

To the Cabinets—from J. J. Rider; Henry F. Shepard; Joseph Short of Philadelphia; James B. King; J. C. Trask of Gloucester; Eben Sutton of South Danvers.

Letters were read from the Trustees of the Public Library of Boston; New Jersey Historical Society; S. A. Allibone of Philadelphia; Henry M. Brooks.

Also from W. O. White of Keene, N.H., tendering to the Institute a portrait of his father, Hon. Daniel Appleton White, our late lamented President—a vote of thanks was unanimously passed to Mr. White for this valuable acquisition to the collection of portraits.

Report of the Secretary was read and accepted.

Report of the Treasurer was read and referred to the Finance Committee.

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F. W. Putnam, made a verbal report on the condition of the collections of Natural History.

From these reports the following abstract is presented, giving a cursory view of the doings during the year.

Four resident members have deceased :—

1. JOHN FELT WEBB, son of Benjamin and Sarah (Felt) Webb. Born at Salem, Feb. 9, 1811, died at Southampton, England, Oct. 20, 1861. Educated at the old Latin school, under master Eames; thence into the counting-room of John Forrester, one of the prominent merchants of Salem, in his day; afterwards supercargo and commander for several years; and finally established himself abroad, where he resided, with occasional visits at home, a large portion of his time, as a commercial Agent, principally at Zanzibar; at which latter place he was for many years U. S. Consul. He was a man of strongly marked character, and was highly esteemed for his probity, intelligence and uniform self-reliance, and was exemplary in all the relations of life, especially as a son, a brother and a friend.

2. WILLIAM MACMULLEN, son of John Macmullen, was born at Salem. In early life he went to Zanzibar, as a commercial Agent, and was for some time the U. S. Consul, at that place. A few years since he returned to Salem and engaged in mercantile pursuits. He died at Salem, Feb. 9, 1862, aged 35 years and 11 months, leaving a wife—Harriet, daughter of Thomas Perkins,—and three children. He was a person highly esteemed and possessed active business qualifications.

3. HENRY KING FETTYPLACE, son of Thomas and Hannah (Devereux) Fettyplace. Born at Salem, Jan'y 28, 1820. Educated at the High school; for some years a clerk in one of the Salem Banks; afterwards went to Mobile, Ala., and engaged in business, where he had resided for more than twen-

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ty years, with the exception of occasional visits to the north during the summer months. He died at Salem, March 10, 1862. He was highly esteemed for his perfect integrity and sense of honor in all business transactions.

4. The news of the death of the fourth reached us, a few days since;—WILLIAM OLIVER POTTER, Capt. of ship Cutwater—washed overboard during a storm near Cape Horn, on his passage from San Francisco to Boston, 18th March, 1862. He was son of Jesse and Susan (Punchard) Potter. Born at Salem, Oct. 7, 1820, educated in our schools, and soon after entered upon a maritime life. As a shipmaster he was possessed of rare excellence, sagacious judgment in matters of business, persevering and energetic. In private life he was much endeared to his friends, generous, cheerful and affectionate.

MEETINGS have been held as in previous years; some doubt was expressed as to the practicability, owing to the state of the country; it was deemed, however, best to continue in the same path as circumstances would admit; the success has more than realized the expectations. Five Field Meetings have been held at Boxford; South Lynnfield; Kettle Cove, Gloucester; Gravesend, Lynn; and Middleton; and eleven Evening Meetings during the winter months.

PUBLICATIONS. The Historical Collections have been printed as usual—Three volumes have now been issued. The first number of Vol. IV, is ready.

To the LIBRARY, have been added 3492 volumes—9801 serials and pamphlets, exclusive of incomplete files of newspapers unbound. With few exceptions, donations, and have been received from twenty-seven societies, or departments of state and the national government, and seventy-seven individuals.—The principal addition was the bequest of our

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President, Hon. D. A. White, which numbered thirty-three hundred volumes, and eight thousand pamphlets or serials—comprising works in the various departments of history, literature, and science—many are rare and exceedingly valuable to the historical student.

Historical Department.—In December the Curators issued a circular requesting cooperation in making a collection of any matter relating to the present war which may serve to illustrate its causes, origin and progress. In response to the same, valuable contributions have been received from Messrs. W. G. Welch, B. E. Shaw, Henry Merritt, J. C. Chadwick, G. F. Austin, G. P. Ives, Salem Volunteers in 21st Mass. Reg. by A. F. Walcott, Mark Lowd, Mrs. J. Chamberlain, Charles Davis of Beverly, William Hulin of Rockford, Ill., John Robinson and others.

Mrs. F. G. DePeyster of New York, has presented the portrait of her uncle Jonathan Goodhue, an eminent merchant of New York. He was the son of Benjamin Goodhue, and was born at Salem, June 21, 1783, and died at New York, on Friday the 24th of November, 1848.

Donations have also been received from Mrs. H. M. Colcord of South Danvers, W. O. Potter, John G. Felt, J. J. Rider, Charles Hoffman, Mrs. D. A. White, C. F. Williams, Henry M. Brooks and others.

Department of Natural History.—It is noticed that our sea-faring friends have continued active in filling the cans with choice and rare specimens, Messrs. E. D. Ropes, William Crandall and others may be mentioned.

Addison Flint of North Reading, presented a living specimen of Emys Blandingii; Prof. M. Miles, a collection of Fishes and Reptiles of Michigan. Miss S. A. Chever, a collection of Shells from East Indies. Miss R. Johnson, Shells from Aspinwall. Mrs. T. S. Greenwood of Ipswich,

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a fasciculus of pressed Sea-weeds. Mrs. F. M. Creamer, fruit and leaves of the great California Pine. C. Cooke, a fasciculus of pressed plants from Zanzibar. N. Ingersoll, J. G. Waters, G. H. Devereux, W. S. Daland, S. Barden of Rockport, Joseph Short of Philadelphia, E. E. Chever, J. Cleaves, C. W. Felt, A. H. Wardwell, S. Cloutman, Minerals.

TREASURER'S Statement of the financial condition for the year ending, May 1862.

GENERAL ACCOUNT.

Debits.

Athenæum—Rent and one-half fuel and attendance,	$457 75
Cases, $300; Books, $10; Stationery, $11 95,	321 95
Printing, 396 15; Gas, 4 53,	400 68
Express, Postage, &c.,	21 46
Department of Natural History	50 12
	$1,251 96

Credits.

Balance of accounts of 1861,	55 61
Assessments, 574 00; Webster Bank, 30 00	604 00
Salem Savings Bank,	300 00
Sale of Publications,	233 80
Historical Account 32 13; Sundries, 7 50,	39 63
Balance,	18 92
	$1,251 96

HISTORICAL ACCOUNT.

Debits.

Books, 10 00; Publications, 32 13; Sundries, 9 87, $52 00

Credits.

Naumkeag Bank, 12 00; Mich. Cent. R. R., 40 00 52 00

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NATURAL HISTORY AND HORTICULTURAL ACCOUNT.

Debits.

Taxidermy 9 87; Books 4 00; Preservatives, 11 19	25 06
Glass 62 47; Sundries 14 59, - -	77 06
	102 12

Credits.

P. S. & P. R. R., 12 00; Lowell Bleachery, 40 00,	52 00
General Account, - - - - - - -	50 12
	$102 12

The following officers were elected for the year ensuing and until others shall be chosen in their stead, viz:—

President—ASAHEL HUNTINGTON.

Vice Presidents—Samuel P. Fowler, James Upton, Abner C. Goodell, Jr.

Secretary and Treasurer—Henry Wheatland.

Librarian—John H. Stone.

Cabinet Keeper—Richard H. Wheatland.

Finance Committee—John C. Lee, R. S. Rogers, George D. Phippen, Henry M. Brooks, James Chamberlain.

Publication Committee—A. C. Goodell, Jr., Henry Wheatland, George D. Phippen, Ira J. Patch, John H. Stone, George M. Whipple.

Library Committee—J. G. Waters, David Roberts, A. Crosby, N. J. Holden.

Curators of Natural History—In Botany—C. M. Tracy; Mammalogy and Ornithology—F. W. Putnam; Herpetology and Ichthyology—R. H. Wheatland; Articulata and Radiata—C. Cooke; Mollusca and Paleontology—H. F. King; Comparative Anatomy—Henry Wheatland; Geology—H. F. Shepard; Mineralogy—D. M. Balch.

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Curators of History—Ethnology—Wm. S. Messervy, M. A. Stickney, F. H. Lee; Manuscripts—Henry M. Brooks, Ira J. Patch, L. R. Stone, G. L. Streeter, S. B. Buttrick; Fine Arts—F. Peabody, J. G. Waters.

Curators of Horticulture—Fruits and Vegetables—James Upton, John M. Ives, J. F. Allen, J. S. Cabot, John Bertram, R. S. Rogers, George B. Loring, C. F. Putnam; Flowers—F. Putnam, W. Mack, C. H. Norris, B. A. West, George D. Glover.

A Committee was appointed consisting of Messrs. Allen W. Dodge of Hamilton, C. M. Tracy of Lynn. S. P. Fowler of Danvers, John M. Ives, R. H. Wheatland, C. C. Beaman, and C. H. Norris, to arrange for the Field Meetings the coming season.

A committee was also appointed to arrange Lectures for the ensuing winter if expedient, also the evening meetings. Messrs. A. C. Goodell, Jr., C. C. Beaman, W. J. Rolfe, H. M. Brooks, C. H. Norris, E. B. Willson, F. W. Putnam, and James Kimball were appointed on said Committee.

Voted, That the Curators on Horticulture be authorised to arrange for the holding of several exhibitions of Fruits and Flowers during the ensuing season, if advisable.

Donations since the meeting of the 25th of April, were announced.

To the Library—from S. G. Wheatland; J. B. Alley, M. C; William Briggs; J. L. Sibley of Cambridge; E. B. Willson; J. J. Rider; Mrs. G. H. Chase; Charles F. Barnard of Boston.

To the Cabinets—from J. J. Rider; Henry F. Shepard; Joseph Short of Philadelphia; James B. King; J. C. Trask of Gloucester; Eben Sutton of South Danvers.

Adjourned.

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Wednesday, July 2, 1862.

FIELD MEETING AT SOUTH DANVERS. The location of this, the first gathering of the kind this season, had been placed at the pleasant little village of "Rockville" near the notable erratic called "Ship Rock", which, as often before stated, has been for several years preserved to the uses of science by the protection of the Institute.

A considerable number attended this meeting, arriving by railroad from the several towns most usually represented, and stopping at Newhall's Crossing, where a rather enterprising saw-mill works busily away under the influence of Goldthwait's Brook. Many of the old familiar faces of our friends were found with us on this occasion, testifying, better than words could do, what enduring satisfaction is to be had in the study of nature in her own undisturbed retreats.

The various divisions of the company having pushed their explorations in this that and the other direction, as far as time or inclination would allow, and gathered all matters of interest which the circumstances made available, the lunch was despatched in true pic-nic style.

The afternoon meeting was subsequently called to order in the village chapel, at three o'clock, by Vice President, Samuel P. Fowler, of Danvers.

Donations, since the annual meeting in May, were announced.

To the Library—from the New Jersey Historical Society; Montreal Society of Natural History; J. F. Worcester; N. J. Holden; Maryland Historical Society; Messrs. Daland; Boston Society of Natural History; Philadelphia Academy of Natural Science; Henry F. Shepard; American Statistical Association; C. B. Richardson of New York; E. P. Robinson of Saugus; Massachusetts Legislature; American

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Antiquarian Society; American Academy of Arts and Science; Fitch Poole of South Danvers; Smithonian Institution; New York Mercantile Library Association; Miss A. M. Hemmenway, of Ludlow, Vt.; W. P. Tucker of Brunswick, Me.; Luke Bemis of Boston; John B. Alley, M. C.; Allen W. Dodge of Hamilton.

To the Cabinets—from Joseph Short of Philadelphia; Eben. B. Symonds; Henry Merritt; W. O. Potter; Henry F. Shepard.

Letters were read from Maine Historical Society; Mercantile Library Association, Boston; American Geographical and Statistical Society; New Jersey Historical Society; Pennsylvania Historical Society; Smithsonian Institution; Minnesota Historical Society; Henry Barnard of Hartford, Conn.; Fitch Poole of South Danvers; S. H. Grant of New York; Miss A. M. Hemmenway of Ludlow, Vt.; E. P. Robinson of Saugus; Department of the Interior, Washington; W. R. L. Ward of New York; A. A. Smith; C. B. Richardson of New York; C. M. Endicott; S. D. Bell of Manchester N.H.; C. M. Tracy of Lynn; F. W. Putnam; S. P. Fowler of Danversport; W. S. Cleveland; Isaac M. Long.

F. W. PUTNAM of Salem, from the Committee appointed last year to investigate the character and habits of the Army Worm, submitted a detailed report on the subject, prepared at his request, by Mr. SHURTLEFF of the Cambridge Museum: As a preface to the Report, Mr. P. stated some of the leading facts as to the ravages of this worm last year, and also that it had appeared again this season, but not to the same extent. At the close of the reading, on motion of Mr. Goodell of Salem, the thanks of the Institute were voted to the Committee for their very instructive report.

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Report on the Army Worm, *Leucania unipuncta* Haw.

By Carleton A. Shurtleff of Brookline.

The nation was not more surprised at the audacity and wickedness of the Southern traitors last year, than were the farmers at the appearance and ravages of the Army Worm last Summer; they came in such myriads and were so voracious that they threatened the destruction of the entire grain crop where they appeared. Most persons considered them entirely new, and to many uneducated in the laws according to which nature works they appeared to be spontaneously created from the earth itself.

But we find this visitation is not unparalleled; they often appear at the South and do immense damage; and we have had them here before; they have visited Massachusetts on a number of occasions in the olden time; I take Dr. Fitch's dates from the Boston Cultivator.

"In 1743 there were 'millions of devouring worms, in armies threatening to cut off every green thing.' Flint's 2d Report, Agric. of Mass. p. 36.

"In 1770 a black worm about an inch and a half long, devoured the grass and corn. They all moved in one direction, and when they were intercepted by furrows in ploughed land, they fell into them in such numbers as to form heaps. They sought shelter in the grass, a hot sun being fatal to them; they disappeared suddenly about the close of June and beginning of July.'—Webster on Pestilence vol. 1, p. 259.

"Eleven years afterwards the same kind of worm appeared again, but they were few in number."—Cultivator, 10th Aug.

"1790—Millions of the same black worm reappeared in Hartford and Norwich, Conn."

"1817—It appeared May 22d in Worcester; also in Albany." It is stated in the Albany Argus that it attacked flax particularly. Now as I have seen it stated that the army worm of 1861 did *not* attack flax, these may have been different species, though they may have been harder pushed for food then, than in 1861. Everything else we know of their habits goes to show that they were probably

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the same species, and all our entomologists I believe consider them so; but we have no definite proof that I know of on either side.

They have not been noticed generally since 1817 in this part of the country, but it must not be supposed that they have lain dormant during all that time, nor that they were then exterminated and now recreated; they have undoubtedly appeared every year since then, but in small numbers, and in places unfrequented by those who would be likely to observe them. In 1860 I took two moths and then considered them quite rare, never having taken them before. This shows that they did not increase quite so suddenly as most persons think, but were more numerous in 1860 than in the years preceding it, and therefore laid more eggs for 1861.

Dr. Fitch (and Mr. J. Kirkpatrick and other observers corroborate his opinion) thinks that the army worm originally belonged to the swamps and has emigrated from them to the fields. He says before each swarm of them we have had a dry Summer, which would allow them to develop large quantities of moths, the caterpillars being better able to arrive at maturity. And the spring following has been wet, driving the moths up to the high land to lay their eggs, which would produce the immense numbers we see. This theory will do very well if they are found to lay their eggs in the spring, but Mr. Walsh thinks that they lay their eggs the same summer, and he brings forward very strong reasons for thinking as he does. I am sorry that I cannot add any information of my own, but I was unable to keep my moths till they laid their eggs.

In a letter to Mr. F. W. Putnam, May 15, which has been kindly lent to me by that gentleman, Mr. S. P. Fowler says, that "There appeared to have been some eggs deposited around the sides of the flower pot (in which the moths were) and had the appearance of being interwoven with a cotton substance. Some writers I notice say that this insect deposits eggs near the roots of grass in sacks resembling cotton. Those I noticed were not enclosed in a sack." I do not feel at all satisfied with these eggs, for I do not know of any Noctuid depositing its eggs in this manner in a cottony sub-

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stance; they are always laid close together and perfectly uncovered, in irregular patches. May these not have been the cocoons of minute ichneumons enveloped in their loose silk.

I saw the worms at work in an oat field belonging to Mr. Everett at the Rock, Middleboro', Mass.; it was the only field in that vicinity which was troubled by them, as far as I could learn from the neighbors. I am not certain but I think that this sloped down to a meadow from which they may have come. I put some of them in a box and carried them home with me; they went into the ground July 31, to transform into pupæ; it took them two or three days to cast their larva skins and become pupæ, and on the 16th of August they came out perfect moths.

The time of appearance varies in different localities; according to Mr. Kirkpatrick, in Ohio below the latitude of about 40° N., they were two or four weeks earlier than north of that line. In Sydney they changed into pupæ June 16th, into moths July 7th, while only eighty miles farther north, in Cuyahoga Co., the caterpillars were observed, Aug. 1, changed to pupæ Aug. 6th, and allowing at least a fortnight to transform, they probably turned to moths Aug. 20th. It seems very strange that so little difference in space, should make so much in time, over six weeks to eighty miles, and yet they could not have been different broods. The worms I found at Middleboro' came out Aug. 16th, about the same latitude as the brood at Cuyahoga Co., which came out about the same time. In Danvers Mass., Mr. S. P. Fowler, noticed them first, Aug. 1, a little later than I found them at Middleboro'. Probably this difference would be much increased if we should take greater distances, and we should find in the Southern States, there were two broods, while there was only one farther North.

I have never seen any description of the eggs of the army worm nor of the young larvæ. Mr. Walsh thinks that there are not two broods in a year at the North, and consequently that the eggs must be laid in the summer. Mr. Fowler's observation would go to prove this. I have room for only an abstract of his reasons: First,—they are never found in meadows the year after seeding, while if the eggs

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were laid in the Spring, there is no reason, why they should not be found. Second,—they are scarcely ever found in wheat or rye, except when they have travelled from grass meadows. Third,—No one ever saw the second brood, and the grasses are too hard for them to eat when they would be hatched. Fourth,—they would form an exception to the rule among *Noctuids* which are single brooded. I have not sufficient data to decide between the two opinions, but it seems more probable that Mr. Walsh is right.

He thinks that the eggs are laid soon after the moths leave the pupæ, and remain on the stems of grass near the root, until the following summer or spring; the caterpillar gets its growth in four or five weeks, doing the principal damage in the last week of its larval life. Those that I saw working at Middleboro' mounted the oat stalks and eat the blade of the leaf, as far as the part that sheathes the stem, thus stripping the whole field of leaves, and making it look like a plantation of canes; they also tried the heads but found them unpalatable, so they eat but few, though they cut off very many and allowed them to drop, to such an extent that the ground was strewed with them. They fed morning, evening and night, protecting themselves from the hot sun at mid-day, coiled up under leaves or loose earth at the bottom of the stalks. I have not heard of their eating any plants except those which belong to the family of grasses and the delicate shoots of the turnips. When they have stripped one field, they march to another. In the Prairie Farmer, July 4th, 1861, we find the following description of their march.

"An army of them was observed to travel sixty yards in two hours, in an effort to get around a ditch. They began to travel from the infected districts between two and three o'clock, P.M. Toward sundown the tide of travel was retrograde. They did not travel at night. They fed chiefly by night, and in the forenoon. As to their number, they have been seen moving from one field to another *three tiers deep*. A ditch has been filled with them to the depth of *three inches in half an hour*."

When full grown they measure about 1.5 inches in length; the head is light brown, as large as the next seg-

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ment, it is marked with dark brown, as if covered with a lace veil, a longitudinal stripe of the same color in front, on each side a smaller one. Body dull greenish, lighter on the belly, an almost continuous white line on the back, with a wide dark one on each side, fading off from it, till it reaches another black stripe, then another white one tinged with reddish brown, bordered with black, a fine white one, another black one, in the lower border of which are the very black stigmatæ, next a fine white one, another reddish brown, lighter than the others, another fine white one, and last the belly, greenish brown, variegated with fine brown spots; ten prop legs, naked, some much lighter than others.

When they have arrived at this state, they leave off feeding, and go into the ground, where they cement together the earth around their skins, and turn into pupæ of a mahogany color. The chrysalis or pupa remains quiet until it bursts its shell and comes forth a moth; in about half an hour it has its wings expanded and ready for flight; it then flies around, pairs, and deposits its eggs, not living probably over three weeks in this its final state.

The fore wings and front part of the body of the moth, are reddish brown; on each fore-wing, a little beyond the middle, there is a bright white spot, from this, nearly to the body, a black line runs along the median nervure, half way between this spot and the outer margin of the wing, is a row of black dots, one to each nervure, from the front branch of the median nervure a black line runs obliquely to the apex; there is another row of black dots beginning at this line and extending to the inner angle, a dot alternating with each nervure. The hind wings are pearly grey, lighter towards the body, particularly underneath. The hind body is blueish grey. The legs, underside of the body, and collar-like band above the head, are lighter; the antennæ are also lighter at the base; the tongue is well developed. Expands 1.7 inches. A very accurate and scientific description of the insect will be found in the sixth annual report of the Secretary of the Maine Board of Agriculture, 1861, on the 130th page, by A. S. Packard Jr.

Among the higher animals parasites are inconspic-

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uous; not so in insects, here they occupy an equal footing with those which they destroy. The parasites of the army worm are quite numerous. There is at least one of the Diptera, the *Senometopia militaris*, Walsh. And among the Hymenoptera, we find *Ophion purgatus*, *Mesochorus vitreus*, Walsh; *Pezomachus minimus*, Walsh; *Microgaster militaris*, Walsh; *Ichneumon Leucaniæ*, Fitch; and one or two others figured in the last edition of Harris under the article on the army worm. The *Chalcis albifrons*, Walsh, is parasitic on *Pezomachus minimus;* and *Glyphe viridascens*, Walsh, on another ichneumon; thus are counterchecks brought to bear upon the checks themselves. The *Calosoma Calidum*, though not a parasite, destroys a great many of the caterpillars.

But not only are insects our friends, but also the birds greatly benefit us, far more than enough to pay for the harm they do. The army worms are eaten greedily by all our black birds, crows, robins, &c. So let our interest cry mercy with our pity, and protect our beautiful feathered friends.

In spite of all these natural checks, we see that sometimes the insects are permitted to increase beyond their place, and it becomes necessary for us to protect ourselves against them. I will now therefore proceed to consider the methods which have been found the most effectual for keeping them in check, and protecting our crops from them.

If it is true that they lay their eggs in Summer near the roots of the grass, we have all the knowledge of their economy we need to enable us to fight against them in the surest way; we know every stage of their life, and have only to find the best means of attacking them in the different circumstances under which they present themselves.

It appears from Mr. Walsh's investigations, that the best time to destroy these insects is at the beginning of their existence, while they are still in the egg; all that is necessary to accomplish this result is to burn the fields in the dead of the year; by so doing all the eggs in the grass are burned, and the fields are much improved, the old stubble is removed, while the ashes contain all the chemical constituents which would be left if the stubble was allowed to decay in

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the natural manner. It was found that the fields which were burned Winter before last, last year were free from the army worm; so theory and facts agree as to the utility of this process. It seems to me also that this is the easiest, least expensive, as well as the surest means of prevention.

When the worm has appeared, (it not having been destroyed in the egg,) we must provide the pound of cure, the ounce of prevention not having been forthcoming; there are two ends to be aimed at, first, to prevent them from getting into fresh fields, and, secondly, to destroy them in those already infested. The most successful method for accomplishing the first object, is, according to Mr. Kilpatrick, to plow two furrows three feet apart, and as deep as will be made by going over each furrow three times, the side of the furrow towards the field should be very steep, as otherwise the caterpillars would be able to get a foothold and climb up; the sides should be reformed after every rain, since the water washes them down and makes them hard enough to enable the insects to climb up. In the second place, where they are in a field, we must expect to lose the greater part of the crop; the best thing appears to be to cut the crop as soon as they are discovered, and remove it at once, as they continue to eat the fallen grain; then turn in the hogs, poultry, &c., and they will have a great feast and fatten on the insects and the grain which they had dropped. In this way the whole crop will not be lost and the chance for the next year's crop will be much improved.

I do not think it would pay to try to destroy them while in the ground; the best way to do it that I can think of would be to turn them up with a harrow, and turn in the hogs and poultry as before. In the moth state, the best method of destroying them, is that suggested by Dr. Harris for the tent caterpillar, namely to build bright fires at night where they abound, into which they fly blinded by the light.

The ichneumons were so industrious last year, in one lot killing fifty-four out of fifty-six, that we may hope their ravages will be much smaller this year, but in some places, I see no reason why they should not be even more plenty, for instance among those I brought from Middleboro', not more than ten per cent, were destroyed in this

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way. If the eggs were deposited in large numbers, I see no reason why they should not do well, because all our injurious Spring insects seem to be plentier this year than common, for instance, the *Clisiocampa decipiens* (*americana* of Harris) the common caterpillar, the canker worm *Anisopteryx vernata*, *Vanessa Antiopa*, *Chyllopaga quercina* the dor bug, and others not so well known.

I have seen in the newspapers that the army worm has appeared in the southern part of this state, and also in Kentucky, but I do not know how large its numbers are. If the proper care is taken, I do not think we need be troubled about them; it was the suddenness of their appearance and our ignorance of their habits, which gave them the importance they had last year; now we are prepared for them, and need not have any care except to protect ourselves.

The chair remarked that the Army Worm was not the only insect found with us that deserved our study. He had brought specimens of one which seemed to be but little known, and which he considered worthy of investigation. It infests the Gooseberry and Currant bushes, but he had never noticed them so doing, till the present season.

S. C. Bancroft, of South Danvers, thought the creature was no new comer, but perhaps had taken to new fields of depredation. He was sure he had been long familiar with it, and had often seen it on the Woodwaxen.

F. W. Putnam, of Salem, made some further remarks on the subject, when on motion of Rev. C. C. Beaman, of Salem, the matter was referred to the same committee who had just reported on the Army worm.

Alpheus Hyatt, of Cambridge, gave the result of his geological observations upon Ship Rock and other boulders in the vicinity, and explained the researches and conclusions of Agassiz, and others, on the great drift formation

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and its probable connection with a stupendous system of ancient glaciers.

C. M. Tracy of Lynn, gave some description of the plants gathered during the day. Among these were found an *Azalea*, a *Kalmia*, several *Silenes* or Catch-flies, an *Utricularia*, or Bladderwort, and some of the Cornels, with many species of other kinds. By request he gave some exposition of the character and habits of that pest of the pastures, the Woodwaxen. Among the Pea family, to which this plant belongs, it presents an anomaly in its simple leaves, the general tendency of all leguminous plants being toward compound ones. The Woodwaxen ripens abundant seeds, and spreads itself with great rapidity; yet it has never found congenial soil far beyond Eastern Massachusetts or, in fact, beyond Essex County. It is said to afford a fine yellow dye, but it is doubtful if any such use has been made of it in this region. Like all troublesome plants, it is beset with methods for its extirpation; plowing, mowing at flowering time, and feeding down with sheep, being all recommended. It never comes into cultivated lands, or rarely, and therefore the operation of these means against it has probably never been fully tested.

Dr. George Osgood of Danvers, the veteran botanist of the Institute, followed in a course of remarks on the plants found by him, evincing the unabated enthusiasm that always marks his botanical efforts.

F. W. Putnam took the opportunity to speak of the collection of insects and other small animals, made by a class of his pupils in Salem. Moths and beetles, with a rare dragon-fly, appeared among the insects, and a variety of snakes, toads and frogs, made up the set. Mr. P. explained

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the transformations of the latter creatures very happily, and also alluded to the large variety of spiders that had been found, representing a highly interesting, but poorly understood class of animals.

GEORGE D. PHIPPEN of Salem, had found a specimen of the common Red Clover (*Trifolium pratense*) which, by some obscure process of nature, had produced its flowers of nearly a pure white. This was made the basis of remarks on hybridization and the origin of varieties among plants.

Mr. BANCROFT had often heard of an animal called the "Hair Snake" found in stagnant water, and said to originate from the hair of animals. He would like to have information about this creature, which he had often seen.

Mr. PUTNAM said, in reply, that this was one of the idle stories used by those who knew nothing of science, to explain facts without the trouble of observation. The truth was, a real hair could never become a living animal under any circumstances. The *Gordius*, or Hair Snake, is a true and legitimate creature, with a regular progressive development and the condition in which it so resembles a hair, is one of its stages. It bears considerable affinity to the tapeworm and others belonging to that class.

T. M. STIMPSON of South Danvers, made a few remarks upon this meeting at the Bowlders; expressing much interest in the suggestions of Mr. Hyatt on the subject of glacial action, &c., and concluded in offering a vote of thanks to Mr. H. for his instructive and interesting remarks; unanimously adopted.

On Motion of Rev. C. C. Beaman, voted that the thanks of the Institute be tendered to the proprietors of the Chapel, and to Mr. Joel F. Needham and others for civilities and attention. Adjourned.

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Thursday, Aug. 7, 1862.

FIELD MEETING AT ROCKPORT. The extension of railroad communication from Gloucester to Rockport, recently opened, contributed, probably, to attract the large party who went in the early train to visit the extreme settlement of Cape Ann. Not only nearly all of those whose pleasant countenances usually enliven these meetings were there, but many were noticed; visitors from places further away, devotees of science, seeking much anticipated pleasures under the patronage of the only society that holds "field meetings," in this region.

The dispersion of the explorers was, of course, in many directions, as usual. A part set out for Long Beach, a part to Pigeon Cove. Some examined the shore, and some the interior, or mused and studied among the memorials in the old burial ground. But much the largest division turned toward the great institution of Rockport—the granite quarries. Here they rambled and enjoyed themselves; hammering out the curious crystals, or watching the varying movements of the derrick, the steam-pump, or the powder-blast.

Reassembling at Johnson's Hall, the company disposed of a plentiful repast, and at half past one o'clock, the formal meeting was called to order by Vice President A. C. Goodell of the Historical Department.

Records of preceding meeting were read.

Donations were announced from the following:

To the Cabinets—from Richard Phillips Jr. of Topsfield; James B. Curwen; David Thomson; George F. Flint of North Reading; Mrs. I. Ward; William H. Foster; W. G. Webb; Dudley Weeks; Reuben W. Ropes of New York.

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To the Library—from Joseph Cloutman; B. Barstow; W. G. Webb; F. Peabody; Charles L. Flint, Secretary of Mass. State Board of Agriculture; Department of the Interior, Washington, D.C.; Estate of the late D. A. White; Montreal Society of Natural History; Philadelphia Academy of the Natural Sciences; Canadian Institute at Toronto; C. B. Richardson of New York; Charles A. Ropes.

Among the donations announced was a fine specimen of *Orthagoriscus mola*, or sun-fish, which was taken in the Bay a few weeks since by Capt. David Thomson of this city. This specimen was smaller than the one described by Storer in his Report on the Fishes of Massachusetts being forty inches in length, breadth two feet, and from the tip of the anal to that of the dorsal fin about four feet six inches.

A specimen of *Emys Meleagris* of Agassiz, described by others under the name of *Cistuda Blandingii* taken in North Reading, was presented by Mr. George F. Flint. The above facts are worthy of record, on account of the rarity of these species in this vicinity.

Letters were read from F. G. Sanborn; Department of the Interior; J. L. Russell; Smithsonian Institution; C. M. Tracy of Lynn; S. Barden of Rockport; Sidney Barnett of Niagara Falls; Carleton A. Shurtleff of Brookline B. R. Symonds.

Rev. Stillman Barden of Rockport, our entertainer for the day, then introduced to the meeting Newell Giles Esq., President of the Rockport Branch Railroad, who said he did not propose to make any speech, that would be done for him by his friend who had introduced him. But he would express the pleasure he felt in meeting the members of the Institute to-day, and would assure them of the feeling of

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cordial welcome with which their friends of the town received them.

Mr. BARDEN would act on his friend's suggestion so far as to give a slight delineation of the geology of this region. It was, in fact, a pleasure to speak thus to a company from such various localities, most of whom, probably, never visited these quarries before. This is a region of hard, stern granite; unpoetical, perhaps, but full of interest to the mineralogist. The rock seems like sienite, from the very dark hue of the mica, but is yet a true granite with all the value of that eldest of all the rocks. Within some thirty years three veins have been found in it, where the components have crystalized more separately, and in larger masses than common; and here a variety of rare minerals had been gradually detected. Among these the showiest and best known was the Green Feldspar. Black Mica was found in good specimens, and Quartz of very fanciful colors and fine forms.

Mr. FRANCIS ALGER of Boston, pursued the subject with some description of another mineral detected to-day, which had occasioned some discussion. Some had thought it Iolite, but he rather supposed it to be Fluor Spar. He had been especially interested in examining the trap dykes that cut through the primary rock, and the alterations in that rock, induced by the intrusion of these once molten masses. The Green Feldspar of this place he thought quite equal to that from Siberia.

JAMES J. H. GREGORY of Marblehead said that some curious facts as to the crystallization of this granite might be detected in the structure of the rock as it is to-day. Masses of other kinds than granite were inclosed in it, themselves

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crystallized like the matrix, and both homogeneous. They were, when shut up here, solid enough to keep their mass and yet fluid enough to crystallize most perfectly. Granite was, indeed a most interesting subject of study. The two projecting piers, of Rockport and Marblehead were granite breakwaters, defending Boston Harbor from much of the force of the terrible "northeasters." As a paving stone, nothing was better than granite; trap indeed was, from the nature of its fracture, better for macadamizing, but did not wear as well for pavement. As a soil-maker, granite, especially the sienitic sorts produce better fruit than any other formation; the feldspar, when decayed, was a good fertilizer, as well as essential to the porcelain-maker. But the great use of the granite is as a water-bearer. Nothing else compares with it in this, as we at once see by comparing the water of such a region with that of a limestone country, and the effect on the health of the people, observable in either case.

Stephen D. Poole of Lynn was sorry not to have more time to examine the mineral treasures which the quarries would evidently furnish. He had made some study of the mineral spoken of by Mr. Alger. It was something like Iolite in appearance, but he believed it was Fluor Spar. He had known Fluor to be mistaken on first sight before. Some was found at Lynnfield a few years ago, and called Amethyst, till chemical tests settled its real nature.

Rev. E. B. Eddy of Portsmouth, N.H., had, as a mineralogist much enjoyed this day. These minerals were often spoken of as mere stones, but they were real gems. There should be more eyes and hands at work to save them. He was told that to make the foundation of the breakwater

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here, tons of this very rock containing these beautiful crystals, had been thrown into the sea like rubbish. Never let it happen again. Agate might be found here, in a broken state; probably it is brought here from Labrador by the floating ice. Other minerals will repay the search, if all, ladies and children even, will study and collect what they may.

Rev. Joseph Banvard of Worcester, late of Salem, gave an address of exceeding interest, stating the incidents of what he called his conversion to the importance and beauty of Natural History. The delights of communion with the Great Architect through his lovely works, were vividly depicted, and the speaker declared that to him who approached the study for the first time, it was like the addition of another sense.

Dr. George Osgood of Danvers introduced the botanical part of the exercises by exhibiting his collection of specimens, some of which he regarded as rather unusual and interesting. But his years rendered him, he said, incapable of speaking, or doing more than show himself and his attachment to science. He wished his friend Tracy would speak for him.

C. M. Tracy of Lynn, was always glad to testify to the value and attractiveness of botanical pursuits, at every proper time. But this occasion needed nothing from him. Here was a man of eighty years, a botanist from youth, standing before them to say that he loved his world of plants as well as ever. Again, this was hardly a fit occasion for botany, for Flora seemed very properly overruled in favor of Pluto. These ancient rocks, the strong casket of so many jewels, were, under the eye of such students as we

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see here, material enough to repay the study and discussion of hours, nay, days, uninterrupted by anything on other topics. He further explained a few specimens, and spoke of the constitution of the soil here, as connecting the mineral and vegetable worlds, and showing, as everywhere, the influence of the rock on the plants it sustains.

GEORGE D. PHIPPEN of Salem, on being called upon, stated that he had greatly enjoyed the day's ramble, and appreciated the attention and skill of the guides who well understood the chief points of scientific interest of this remarkable place; but that which most engrossed his mind was the grand expanse of the Atlantic, here spread out to the view,—the same broad old ocean over whose ever-heaving waves our father's first came to these shores, and which with its everlasting rocky fringe must appear to our eyes to-day, almost precisely as it did to theirs two centuries ago. In answer to some inquiries as to parasitical plants, Mr. P. said that we had only one true parasite in this region, to wit, the Dodder. This is a very elegant as well as curious plant, and will reward any one for their study of it. He formerly tried the cultivation of it with very gratifying success.

Mr. A. E. VERRILL of Cambridge, at the request of the chair, gave a short acount of the few marine animals on the table; after which he presented a sketch of the classification of Birds, as adopted by most of the leading ornithologists of the day. Though naturalists have always agreed as to the limits of the class, they have differed widely as to the way in which it should be subdivided into minor groups. Thus the number of orders admitted among birds by different naturalists, varies from two to twenty-eight.

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The arrangements which have been most generally adopted in this country are slight modifications of those of Linnæus and Cuvier. Perhaps the one best known is that admitting seven orders, viz:—

Raptores, or birds of prey,
Insessores, or perching birds,
Scansores, or climbers,
Rasores, or scratchers,
Cursores, or runners,
Grallatores, or waders,
Natatores, or swimmers.

Most authors have put the birds of prey at the head of the list, as the highest or most perfect birds. This on many accounts seems wrong, for if we examine those birds which have all the characters that are commonly considered bird-like in the greatest perfection, we shall find them not among the Raptores, but among the singing birds of the order Insessores in the arrangement above. Some authors have put the parrots highest on account of their fleshy tongues, analogous to those of mammals, but the same objection applies to this arrangement, since this character is an aberrant one, and not essentially bird-like, and besides this, in other characters, the parrots do not approach the mammals so closely as many of the other birds.

A peculiar classification of birds, first proposed by Oken, but carried out in its details by Bonaparte, is worthy of our consideration. It has certainly the merit of novelty and in many respects seems more natural than any of the other systems. By this method of classification, birds are divided into two sub-classes, according to the state in which the young are hatched from the eggs. All those birds of which the young when hatched are very immature and

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helpless, and feed from the mouths of their parents, are called *Altrices*. The common Robin is a good illustration of this group. Other birds, like the hens and ducks, have young which are able to run about and take care of themselves, in part at least, as soon as hatched. These are called *Precoces*. Each of these sub classes is to be divided into several orders, but Bonapafte himself has made various alterations in the serial arrangement of the orders and sub-orders in his published papers. If we place the singing birds highest, as I have proposed, instead of the parrots, the following arrangement, though somewhat different from either of those of Bonaparte, seems to me the most natural.

Of the *Altrices*, the first order will be the *Passeres*, including the singing birds or Oscines, as well as most of the other small perching birds: second the *Scansores* including the parrots; third the *Accipitres* or birds of prey; fourth the *Columbæ* or doves and pigeons, and perhaps, also, the Dodo, which is very little known, and forms, in one of the arrangements of Bonaparte, a separate order, called *Inepti*; fifth, the *Herodiones*, including the herons, cranes and the like; and sixth the *Gaviæ*, with two sub-orders embracing the gulls, albatross, pelicans, cormorants, &c.

In the second sub-class or *Precoces*, there are four orders; first, the *Gallinæ*, including the hens, pheasants, &c.; second, the *Struthiones*, embracing the ostrich and other similar birds; third, the *Grallæ*, containing the plovers, sand-pipers, and the like; fourth, the *Anseres*, including the two sub-orders Lamellirostres, or ducks, geese, etc., and Brachypteri or auks and divers. The penguins in the latest arrangement of Bonaparte form a distinct order, the lowest of the Altrices, but previously they had been placed as a sub-order, Ptilopteri, under the Anseres. The Flamingo which has been placed among the waders, with the

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herons, by most writers, on account of its remarkably long legs and neck, and by others with the swimmers on account of its webbed feet, seems to be very closely related to the ducks and geese by its anatomy, motions and habits, and would form a family in the sub-order of Lamellirostres.

One of the most singular features in this classification is the analogy or parallelism existing between the lower orders of the Altrices and those of the Precoces, similar to that between the families of the marsupials and those of ordinary mammals. Thus the order of Columbæ will be parallel with Gallinæ. Herodiones with Grallæ, and Gaviæ with Anseres, so that we have a scratching order, both among the Altrices and Precoces, a wading order in each group, and a swimming order in each. In a tabular view they will stand thus:—

ALTRICES,	PRECOCES,
Passeres, Oscines Clamatores,	*Gallinæ*,
Scansores,	*Struthiones*,
Accipitres,	*Grallæ*,
Columbæ,	*Anseres*, Lamellirostres,
Herodiones,	Brachypteri, Ptilopteri?
Gaviæ, Totipalmi, Longipennes,	

Rev. A. E. P. PERKINS of Ware, said that the study of the habits of birds was replete with curious interest. He had noticed cases of the most striking instinct exhibited by them. The story of the Cow Black-bird placing her eggs in a nest, not her own, was familiar to all, but he had seen some very singular modifications of this practice, and amusing expedients of the two birds, the owner of the nest and the intruder. He had known something of the classification spoken of by Mr. Verrill, but did not like it, it seemed artificial and forced, breaking, rather than strengthening the obvious natural orders.

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Mr. VERRILL replied, and some discussion ensued.

Rev. JOSEPH B. FELT of Salem, then read an historical sketch of Rockport, including notices of prominent families, statistics of industry, and many other matters of local interest. (Printed in Hist. Coll. of Inst. vol iv, p. 162.

Rev. C. C. BEAMAN of Salem, thought all present had deeply enjoyed this excursion. He, too, delighted in this free view of the ocean, so grand and elevating, and so well calculated to awaken every sublime emotion of the human soul.

Mr. A. HYATT of Cambridge, gave a brief exposition of the theory of the Drift Formation, as now generally received, and also explained, at some length, the peculiar action of waves and oceanic currents in forming pits, ridges, and other inequalities in the sand.

Rev. G. S. WEAVER of Lawrence, bore testimony to the extreme pleasantness of this occasion. He wished he could have the opportunity, now and then, of enjoying such a season, near home. If the Institute would arrange for an early visit to Lawrence, he could assure them of a most hearty welcome.

It was then on motion of THOMAS M. STIMPSON, Esq., of South Danvers, (who supported the motion with agreeable remarks.)

Resolved, That the thanks of the Members of the Essex Institute be tendered to those ladies and gentlemen of Rockport, who have so kindly given their time and services in aid of the objects of the Society; to those by whose liberality the use of the Hall has been granted for our meetings; and to all others who have contributed to render our visit one of pleasure. Adjourned.

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Thursday, Aug. 21, 1862.

FIELD MEETING AT HAMILTON.—A fine day induced the attendance of very many to this meeting, although the spot was by no means an unfamiliar one, having been the scene of more than one visit by the excursionists of the Institute already. But a really good thing seldom tires; and so our friends again came from various directions, a few at a time, in carriages or on foot, and made up a very interesting company, larger than would have been thought, from the appearance of the arrivals.

The diversified surface in this vicinity speedily attracted the attention of the active explorers, some searching the ponds for aquatic plants and animals, some threading the woods and thickets, and others studying the more solid substratum of rock and soil below the whole. A few had come through the woods from West Beach and had much to show and more to tell of the pleasant things met in that path among the ponds.

The meeting for the afternoon was called to order on the spacious platform kept by Mr. Whipple of the place, for dancing uses, when Hon. ALLEN W. DODGE of Hamilton, was chosen chairman, and in an eloquent manner welcomed the Institute to this town of his adoption. He was glad to see so many present, of all ranks and pursuits. He wished he could say a word to induce every one to look as he did upon the works of God in surrounding nature, and enter heartily into their study from this time, as a means of self-culture and improvement.

J. J. H. GREGORY of Marblehead, then proceeded briefly to discuss the geological constitution of this region, refering largely to that of Cape Ann, and drawing, in imagina-

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tion, an historical picture of the geological changes that have heretofore passed upon these hills and valleys around us. Considering the unpromising aspect of granitic and sienitic rocks, we might be led to suppose that a soil formed from them would be sterile; but here the soil has precisely this origin, and its richness is a constant correction of such preconceived errors.

Rev. JOSEPH B. FELT of Salem read a short historical essay on the early times of the town of Hamilton, when it existed as part of old Ipswich. Among the peculiarities of the place he adverted to a line of families among the inhabitants who, from some singular quality of constitution, are and have been known as "bleeders." These persons bleed profusely, and dangerously, even, from the least scratch; and some remarkable facts as to the hereditary descent of this affliction, help to invest the case with much of deep and painful interest. (Printed in Historical Collections of the Institute, vol. iv. page 225.)

Mr. GREGORY inquired what was the meaning of "Naumkeag," the Indian name of Salem.

Mr. FELT said he believed Cotton Mather had defined it as "peace."

Mr. GREGORY thought it merely meant "good fishing place," and was applied to many places along the shore.

Mr. FELT doubted this, and thought this last was rather the interpretation of "Agawam," once the name of Ipswich and several other places.

C. M. TRACY of Lynn, had been one of those who made the delightful excursion up from West Beach, under the excellent guidance of Mr. E. Knowlton. The vicinity of the ponds, where traversed by the West Beach Road, is remarka-

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ble for its growth of beech, the extensive woods of which wear a singular look to him who has dwelt habitually among no forests save of pine and cedar. In these beech woods, and around the ponds, are the haunts of many of Flora's choice works; and not a few of these had been met by him in the walk. Some of these he had brought along for farther remark, such as the Blue Vervain, the Coreopsis and Rhexia, the Willow-herb, the Dwarf Cornel, the Cardinal Flower, and several others.

Mention being made of the Sunflower, the Chair asked if there was any truth in the assertion that it turned toward the sun. Mr. Tracy replied that there was none whatever, Tom Moore's beautiful poetry to the contrary notwithstanding.

George D. Phippen of Salem, gave a somewhat extended discourse on the plants that furnish a fiber for textile uses. Four families, typified respectively by the Mallow, the Milkweed, the Flax and the Nettle afford almost all of this for common use. The two last are sources well known; but the ability of the Milkweed to furnish a delicate and commendable fiber is not well understood. Mr. P. had collected and brought to the meeting selections of such plants as yield beneath their outer bark a strong fibrous tissue known as the bast tissue, and which may be prepared and woven into textile fabrics. He dwelt largely upon the Asclepias cornuti or common Milk or Silkweed, so abundant in the fields and along the road sides throughout a large extent of the country. He also exhibited beautiful specimens of workmanship, both prepared, spun and wrought from the fibre of this plant, by the hands of Miss Margaret Gerrish, late of Salem, deceased, and recently presented to

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the Museum of the Institute. These consisted of purses, work-bags, socks, skeins of thread of different colors, also samples of paper from the macerated fibre, together with considerable quantities of the prepared fibre, of great length, (being the length of the stem,) and having, as all the manufactured articles did, a silvery lustre, considerably resembling silk.

There were also exhibited specimens of the living plant with its novel and honey-laden flowers, and portions of the stem and fibre in various stages, showing its manner of growth and preparation. Specimens prepared by Mr. P. from the fibre of other plants were also presented; such as that from the tall nettle, so plentiful about the stone walls, Urtica gracilis, and Apocynum cannabium, or Indian Hemp, Celastrus scandens or waxwork and other plants; proving conclusively that with these, in addition to Flax and Hemp, under the ingenious appliances of cultivation and machinery, we need not be dependent upon the South or any part of the wide world for material with which to answer that important and industrial question, "wherewithal shall we be clothed."

C. C. COFFIN, Esq., of Malden, known as "Carleton," of the Boston Journal, being invited, entertained the meeting with a vivid account of the memorable gunboat fight before Memphis on the Mississippi. That famous engagement ended the hopes of the rebels as to the production of a Navy. But there were other things than Navies to be conquered in this war; and of these, not the least was that remarkable female influence that from the first had sustained and stimulated the rebellion. Only by an equal awakening of the free born women of the north, can we ever oppose a fit and sufficient instrument to this restless, this powerful auxiliary of southern enormity.

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J. L. SIBLEY of Cambridge, and Librarian of Harvard College, had come down with a friend to see what kind of a thing a "field meeting" might be. He had heard something of these gatherings; but he had not expected to find in them so much that spoke of the active, *living* study of nature, and of the thousand wonderful and lovely things she spreads around us. And as no one in this life knows what may be the consequences of his acts, how much we may be left to inquire, as resulting, one day from such exercises as these. Here was a dissertation on the almost unknown fiber of a common plant. Who can tell what results may follow from what that speaker has told us on that subject, results, perhaps, as broadly affecting the country as the growth and use of cotton already have.

A few other gentlemen favored the meeting with remarks, after which, on motion of Mr. BEAMAN of Salem, the thanks of the Institute were voted to Messrs. John Whipple and Edmund Knowlton, for their efforts to render the meeting successful and pleasant, and to all our friends in this vicinity. Adjourned.

Wednesday, September 17, 1862.

FIELD MEETING AT ROWLEY.—This was the last of the series for this year, and nearly one hundred from other towns availed themselves of the opportunity to visit this time-honored old place, where cluster so many memorials of the past, highly interesting to the antiquary and to the student in our early history. The assemblage were welcomed at the Town Hall, by Rev. JOHN PIKE, the "parson of the parish," in a few remarks of great kindliness; after which, dispersing in various directions, the visitors spent the usual

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amount of time in exploration and research. A general return of these wanderers having been affected, the formal meeting was opened in the Town Hall, at 3 P.M., Vice President A. C. Goodell, presiding.

Records of the preceding meeting read.

Donations were announced—

To the Library—from L. Peirson Ward; M. Savory of Georgetown; Zaccheus Gould of Topsfield; Canadian Institute at Toronto; Henry Barnard of Hartford, Conn.; Jonathan Perley, Jr.; C. B. Richardson of New York; Mrs. E. Putnam; Boston Society of Natural History; Philadelphia Academy of Natural Science.

To the Cabinets—from William Mack; L. Peirson Ward; Miss Rebecca Johnson of Cohasset; Benjamin Felt; James B. Curwen; Charles A. Putnam; S. B. Buttrick; Alfred Stone; Rufus Wendell; W. L. Leach; J. Wingate Thornton of Boston; Reuben W. Ropes of New York.

Letters were read from Trustees of New York State Library; Pennsylvania Historical Society; Trustees of Boston Public Library; S. Barden of Rockport; A. E. Verrill of Cambridge; William Barry of Chicago; R. H. Bacon; A. W. Dodge of Hamilton.

A circular was read from the American Pomological Society, requesting a delegation from the Institute to the Convention in Boston. Referred to the President of the Horticultural department, with authority to act.

Rev. C. C. Beaman of Salem, gave a summary of the historical work of the company about the place. This was the town where Rev. Mr. Bradford established a Divinity School, seventy or eighty years ago, having for one of his

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pupils, Rev. Joshua Spaulding, afterwards of Salem. Here, to-day, they had visited the old Jewett House, built more than two hundred years ago, and seen in it a clock thought to be some three hundred years old, it having been set up in Dorchester sixteen or eighteen years before the settlement of Rowley. It is inscribed "Richard Masterson at ye Diall within Moore Gate." Dummer Academy, one of the ancient institutions of the Commonwealth, had also been visited. Unlike most other such, it has outgrown its tenement twice over, and now inhabits the third building provided for its use. An examination of the old burying ground here had also revealed a store of facts interesting to the historian and antiquary.

Rev. J. B. FELT of Salem then read a paper on the early history of Rowley, largely relating to the character and labors of Rev. Ezekiel Rogers, the first and most noted of her ministers.

Rev. JOHN PIKE of Rowley remarked that but for an inadvertance, the company would, in the morning, have been invited to the private gardens in the place, of which some were worth a visit. For himself, he could fully accept the idea of Mr. Beaman, in reference to his pastorate, that that minister was fortunate, whose church possessed a worthy history. He had often felt the truth of this while seeking to minister to this ancient church; and he had come to the conclusion, that while many ministers would like to choose their successors, he would greatly prefer to name his predecessor, as a far more important thing.

C. M. TRACY of Lynn, had been very busy to-day exploring the botany of the "Stackyard Woods," in connection with a most agreeable party. The successive seasons bring

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out different styles and classes of floral life, so that each gets, as it were, a distinctive mark. The late summer and autumn months are the peculiar time of the Composite Flowers. The Aster is generally taken as the type of these and is one of the most numerous. Nearly forty species are recognized in the Northern States, and of these he exhibited several. The Thistle represents one section of this great family. Yet there are plenty of other kinds of plants in autumn, as, for example, many of the pea-flowered class. In this we see to-day the Bush Clover and the Tick-Trefoil, whose seeds stick to the clothes. The Dwarf Cornel is now in fruit. It is much, on a small scale, like the Flowering Dogwood, whose bark has been substituted for Cinchona. The Prenanthes and Gentians were also spoken of, also the Canada Burnet; and some notice was taken of the Mints, perfectly free from hurtful properties, and affording an appreciable quantity of camphor.

F. W. PUTNAM of Salem, gave some illustration of the zoology of this place, producing several tree-toads, frogs, &c., also a large worm supposed to be the larva of the Five-spotted Sphynx. He gave familiar expositions of the changes of the insect and reptile life during development; and remarked on the erroneous notion that most of our reptiles are poisonous. We have no venomous species in the Eastern States, save the Rattlesnake and an occasional Copperhead. He then proceeded to describe the interior structure of the nest of the Humble-Bee, an insect only imperfectly understood, as indeed are too many of our common animals even yet. It has been estimated that there are six thousand six hundred and thirty-five species, of animals inhabiting New England. Mr. P. added some explanation of the geological record of animal life, and argued that the evidence

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of any species changing its character at any period, or passing into another was not yet sufficient to warrant the statement.

A few other gentlemen offered appropriate remarks, after which on motion of N. J. HOLDEN, Esq. of Salem the thanks of the Institute were tendered to Rev. Mr. Pike, the Messrs. Smith, Prime, Harris, Hills, and Richards, as well as Mrs. Pike and Mrs. Lambert, with others whose kindness to us had been so untiring. The Institute then adjourned.

Monday, Dec. 8, 1862.

Meeting this evening at the rooms, Plummer Hall, A. C. Goodell, jr. one of the Vice Presidents in the chair.

Records of the preceding meeting read.

Donations were announced from the following:

To the Library—from J. W. Thornton of Boston; S. A. Green, Surg. 24th Reg. Mass. Vols.; J. Morrisey of Boston; J. B. Felt; Daniel Barnes of New York; Jeremiah Colburn of Boston; O. C. Marsh; E. S. Parker of Groveland; H. F. Shepard; Boston Society of Natural History; Mrs. N. D. Cole; S. E. Peabody; Trustees of N. Y. State Library; Smithsonian Institution; John L. Sibley of Cambridge; Miss A. M. Hemmenway, of Ludlow, Vt.; A. B. Almon; C. B. Richardson of New York; Theron Metcalf of Boston; George Livermore of Cambridge; Philadelphia Academy of Natural Science; A. B. Johnson of Utica, N. Y.; Trustees of Dartmouth College, H. L. Williams; Zoologischen Gesellschaft, Frankfort, a. M.; D. C. Gilman of Yale College; Joel Munsell of Albany, N. Y.; George B. Loring; Charles H. Dodge; Montreal Society of Natural History; W. P. Tucker of Brunswick, Me.; R. Manning.

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To the Cabinets—from Mrs. H. Brown ; Amos Stillman ; C. H. Norris ; S. Barden of Rockport ; E. Peabody ; Edmund Lovett of Kinsemby, W. C. A. ; H. Brown ; Edward J. Porter ; Daniel Cudner ; James H. Emerton ; John Saul ; J. Choate ; John H. Towne, Sierra Leone ; Edmund Larcom, Beverly.

The Chair presented in the name of Hon. Allen W. Dodge, of Hamilton, three volumes :—1st, by William Holloway, " The Peasant's Fate," published in 1803 ; 2d, by John Searson, published in 1798, " Art of Contentment" ; 3d, a volume by Rev. Samuel Willard, containing 1st, " The Fountain Opened," and 2d, a Sermon on Christian perfection, from the text, " *Be ye Perfect*," &c. Mr. G. gave a short biographical sketch of Rev. Mr. Willard and brief notices of the other publications.

A letter was read from Hon. Robert Hooper of Boston, presenting to the Institute, six MS. volumes, consisting of five camp journals and one letter book, which were the property of the late Brigadier General John Glover, of Marblehead, a distinguished officer in the army of the Revolution, in the name of his descendants. Also a letter from W. R. L. Ward, Esq., of New York, announcing the transmission to the Institute of a volume originally belonging to the same set which was in his possession. These valuable and highly interesting records were referred to by W. P. Upham, to prepare a report in relation thereto, to be read at some future meeting.

A letter from Hon. Nathaniel Silsbee, tendering to the Institute a donation of two paintings, by the late George Ropes, of this city,—one a view of Crowninshield's wharf, (now Phillips') as it was some fifty years since—the other, the launching of the ship Fame.

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Letters were also read from J. H. Hickcox of Albany, N. Y.; D. C. Gilman of New Haven, Conn.; Augustus Towne of Boston; J. Munsell of Albany, N. Y.; Pennsylvania Historical Society; Trustees of N. Y. State Library; Maine Historical Society; Museum of Comparative Zoology at Cambridge; Corporation of Harvard College; American Philosophical Society; American Geographical and Statistical Society; M. A. Stickney; N. W. Hazen of Andover; C. B. Richardson of New York; J. K. Wiggin of Boston; J. C. Hilgard of the Coast Survey; W. C. Binney of Amesbury; and S. F. Haven of Worcester.

On motion of Rev. C. C. Beaman, the thanks of the Institute were presented to the several donors.

F. W. Putnam presented a paper containing a list of the reptiles of the county, accompanying the same with some remarks upon the distinctive characters of the several orders. By the above list we learn that the whole number of species is 40, viz:—Salamanders, eleven; Frogs, five; Tree Toads, three; Toads, two; Scaphiopus, one; Snakes, eleven; Turtles, seven.

The Chair mentioned that a gentleman interested in antiquarian lore, had authorized the Secretary to purchase on his account old MSS. prior to 1700 at the rate of one dollar per pound; from 1700 to 1750, at fifty cents per pound; from 1750 to 1800 at twenty-five cents per pound; the same to be deposited in the library of the Institute. After some general remarks upon the importance of the preservation of old papers, and the probability that much valuable material may be sold to the paper-makers on account of the high price of this article in the market, the Institute adjourned.

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Monday, December 22, 1862.

Meeting this evening, the President in the Chair.

Records of the preceding meeting read.

Letters were read from J. H. Hickcox of Albany N.Y.; George W. Wheelwright and W. F. Poole of Boston; Massachusetts Historical Society; Trustees of the Boston Athenæum; S. P. Fowler of Danvers; S. H. Grant of the New York Mercantile Library Association.

Donations from the following were announced.

To the Library—from Canadian Institute at Toronto; C. B. Richardson of New York; Joshua Coffin of Newbury; W. S. Hiltz; Boston Society of Natural History; American Antiquarian Society.

To the Cabinets—from J. C. Lee; Shove S. Symonds.

The Secretary mentioned that several specimens of the Snow Owl (*Strix nyctea*) had been taken in this vicinity during the present season. In this connection extracts were read from the Canadian Journal, a publication printed in Toronto, under the direction of a Committee of the Canadian Institute, respecting the abundance of these birds on the shores of Lake Ontario, and of their habits. Mr. S. Passamore, a well known taxidermist in Toronto, under date of 17th of November 1862, speaks of having some forty or fifty specimens which had been shot within the past two or three weeks, in that neighborhood, some measuring five feet four inches from wing to wing. Similar numbers are stated to have appeared in 1837. Mr. Passamore gives 1833, 1839, 1853, as abundant years.

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Mr. A. C. Goodell, as Chairman of the Curators of History, proposed for the consideration of the Institute the subject of "New England's Heraldry." The following is the substance of his remarks:

After alluding to the well known fact that it is claimed by the Southern Rebels that they are of better extraction, in the feudal sense, than the people of New England, he proceeded to show that this claim, though utterly unfounded, is beginning to be treated, at home and abroad, as a matter of some consequence in considering the probable event of the struggle which agitates the country.

The wholesale charge of John Arthur Roebuck, the member of Parliament for Sheffield, that the North is composed of a mixed population of people of low origin, of outlaws and criminals, while the South, on the other hand, is largely peopled by the descendants of the Cavaliers, who are therefore more nearly allied to the gentry and nobility of Great Britain, had never, in the opinion of the speaker, met the utter and general contradiction which it deserves.

On the contrary, the silence of the press and even the positive admission of some public Northern speakers, such as the Rev. Dr. Bellows of N. Y., has the effect of establishing this error in the minds of our enemies and in the public opinion of Europe. The speaker said he was glad to know that the newspaper press has, at last, begun to question the truth of this invidious charge.

Dr. O. W. Holmes, too, in the December No. of the Atlantic Monthly, has protested against this error, in very strong terms, in his article, "My hunt after the Captain;" also, Count Gurowski has met the accusation with a scathing denial in his "Diary." It is to be hoped that these indications warrant the belief that the public mind will soon give this subject sufficient attention. The speaker was happy to announce that in several states, persons interested in genealogical and historical studies are at this moment engaged in preparing articles, the effect of which will be to prove incontestably that a far larger proportion of the people of New England are from an ancestry of gentle and noble consanguinity than of the people of the South. Mr.

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W. H. Whitmore of Boston, the author of the "Hand-book of American Genealogy," is engaged in the preparation of a work which is intended to exhibit, as nearly as all known accessible data will allow, the relative proportions of gentry, yeomanry and nobility of the several American colonies. In the course of his investigations, Mr. W. has found that a large MS. volume, now in the library of Peter Force, at Washington, D. C., copied from a similar book in the Archives of the State Paper Office, London, being exclusively, a list of the names of criminals deported to the penal colony of Virginia, contains many names of leading families of the *chivalry* of the present day.

Mr. G. then proceeded to say that Bishop Meade's work on the Old Churches and Families of Virginia, was the only record to which Virginia has hitherto appealed to prove her general claim to Cavalier extraction. Yet we, quiet unpretending people of Massachusetts, can count more and higher names in the list of our gentility without any special effort; and when Mr. Whitmore shall have given the subject a thorough study, we shall undoubtedly, find that the proportion of noble and gentle blood in the whole population, stands, to that of Virginia, as ten to one.

Mr. G. then enumerated some of our old first families—such as the descendants of Emanuel Downing of Salem, whose son, Sir George, in 1664, united in marriage to the Howards (the family of the Duke of Norfolk,) and his descendant of the same name, founded Downing College, Cambridge, England. Also the Salem Curwens, who are descended from the Helsington branch of the Workington Curwens,—at whose head stood Gospatric, Earl of Northumberland,—one of the oldest and noblest families in Europe. Among our Puritan clergy, too, are to be found not only a large number of distinguished graduates of Oxford and Cambridge, but also many who were closely related to high ecclesiastics in the English Church. Thus we have the Nortons of Ipswich, were connected with Archbishop Cranmer; the Rawsons and Wilsons, with Archbishop Grindal, and the former also descended from Bishop Hooker; the Yales from Bishop Morton and Bonner; and the Chauncys from Bishop Still.

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Then we have, in the history of New England, such names as Lady Arabella Johnson, Lady Deborah Moody and her neighbor (who was nobly descended and married a daughter of the Earl of Lincoln,) John Humphrey of Lynn; also, the knights and baronets, Saltonstall, Vane, Phipps, Pepperell and Sir John Temple of Ten Hills farm, Malden, who was descended from the same stock as the Viscounts Palmerston. Lord Chancellor Lyndhurst it will be remembered is a Boston boy. We have, too, many old families of gentry, such as the Appletons, who go clearly back to the year 1414; the Bruens, to the year 1230; the Lawrences to the year 1199, the Adamses and others. The Thorntons, also, who are descended from two Mayors of York; the Sewalls from Henry Sewall, Mayor of Coventry; and the Salem Brownes, from the Brownes of Browne Hall, Lancashire, England, a family, some of whose members removed from Salem to Virginia, and one of whom married a granddaughter of Bishop Burnet. Another family which Salem contributed to Virginia was that of the Fairfaxes. The Hon. Col. William Fairfax was a resident of Salem before he went to Virginia, in 1734. Here he married a lady, born in Salem, Deborah the daughter of Francis Clarke, Esquire, and from this union were Bryan, Lord Fairfax, and other descendants who are considered the very cream of the "F. F. V."

Col. Fairfax was Collector of the Port and lived in the house, still standing on the corner of Cambridge and Essex streets, and his wife's father lived and died in the old house which formerly stood on the Eastern corner of North and Essex streets. Letters and souvenirs from the Fairfaxes, dating from about 1750 to 1820, are still in possession of a descendant of the Clarke family in this city.

Mr. Goodell spoke also of the numerous coats of arms extant among members of our old families, and engraved on tombstones in the old burying-grounds and expressed the hope that all persons possessing such heir-looms would make their existence known to the Institute that they may be copied for Mr. Whitmore's work.

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In reply to a suggestion from Rev. Mr. Beaman, Mr. G. continued his remarks by saying that doubtless many of the leaders of the rebellion will be found, like Slidell, Davis, Stephens and Hammond, to be of obscure northern birth or descent. So that the argument of superior blood by the South not only failed but was even turned against them by the facts of history.

Remarks were offered on this subject by Rev. Messrs. Beaman and Felt, Mr. G. D. Phippen, and the chair.

Adjourned.

Monday, January 12, 1863.

Meeting this evening, the President in the Chair.

Records of preceding meeting were read.

Donations were announced.

To the Library—from A. D. Bache, of the U.S. Coast Survey; American Academy of Arts and Science; J. Colburn of Boston; Samuel H. Scudder of Boston; Mrs. N. D. Cole; Caleb Foote; Trustees of Boston Public Library; Trustees of Newburyport Public Library; Robert Manning; Miss E. K. Roberts; Misses Mulligan of Newburyport; John Chapman.

To the Cabinets—from S. W. Boardman of Milltown, Me.; R. Manning; David M. Balch; Miss M. J. Scobie; G. C. Chase.

A letter was read from Dr. George Chandler of Worcester, presenting to the Institute, in the name of the Misses Mulligan of Newburyport, the Diary of Rev. Samuel Chandler, in four volumes of inter-leaved almanacs of the years 1746, 9, 50 and 51, at York, Maine; and of the years 1751, 2, 3, 4, 5, 6, 7 and 8 at Gloucester, Mass.

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A brief notice of Rev. Mr. Chandler was given. Rev. Samuel Chandler was the son of Josiah Chandler of Andover, where he was born in 1713, graduated at Harvard College in the class of 1735, ordained minister of the church in York, Maine, in 1742, where he remained, occasionally teaching a school in addition to his ministerial duties, till his removal to Gloucester in 1751. In 1755, he went as Chaplain to Col. Ichabod Plaisted's Regiment, in the expedition against Crown Point. He died after a long and severe sickness, on the 16th of March, 1775, aged sixty-two.

Mr. David Nichols presented to the Institute, two photographs of Washington; one, of a small size for albums—the other considerably larger for framing. He then gave a brief history of the original from which these photographic copies were obtained; it has been in his wife's family for many years, and is presumed to be the only one of the kind known. Upon removing it from the frame recently, the following endorsement was found upon the back:—"This was done in New York, 1790, and is acknowledged by all to be a very strong likeness. B. GOODHUE." Benjamin Goodhue was a native of Salem, son of Benjamin and Martha (Hardy) Goodhue, born Sept. 20, 1748, graduate of Harvard in the class of 1766; first Representative to Congress from this district, and was a member of that body as a Representative or Senator from 1789 to 1800. This portrait was shown to many aged persons, who had seen and might remember Washington's appearance, and they all coincided in the opinion of its correctness so far as the recollection of nearly three quarters of a century could be relied upon. Letters were read from the venerable Josiah Quincy ex-President of Harvard University, Jared Sparks, Esq., and others, in relation to the subject.

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Mr. Quincy, in a letter to Mr. Nichols, thus writes :—

"The portrait of Washington, certified by Benjamin Goodhue, Esq., on which you ask my opinion, certainly satisfies my recollections of him, as he appeared in 1789 and 1790. At that time I saw him twice or thrice, and afterwards several times in 1795. The certificate of Mr. Goodhue is also almost conclusive, in my mind, for he was the last man who would sign such a certificate lightly. The common likenesses of Washington, like those of Stuart, which were painted subsequently to 1789, give a false expression to his mouth, owing to having at this period, false teeth—the dentists of that day having not the skill to conceal their work, like those of the present time. I regard the portrait in your possession as quite valuable ; and if, as you state, it was a sketch of St. Memin, it has great pretentions to correctness. I well knew that artist. He had great merit, and if it be from his hand, its correctness may be depended upon, and it is worthy of preservation."

In connection with this subject, Mr. H. M. Brooks exhibited several Washington medals, some of which were very beautiful. Mr. Brooks has had medals or coins with the impression of Washington struck from some two hundred different dies—the earlier ones were all complimentary.

An interesting discussion then followed on this subject; after which the Chair gave an interesting account of the designs of the Mount Vernon Association in Essex County, and also of a visit he made to Ashland, the home of Henry Clay, in the summer of 1861.

Adjourned.

Monday, January 26, 1863.

Meeting this evening, the President in the chair.

Records of preceding meeting read.

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Letters were read from Historical Society of Pennsylvania; J. P. Lesley of American Phil. Society; N. S. Howe of Haverhill; A. E. Verrill of Norway, Me.; W. F. Poole of Boston; W. P. Upham; H. Curwen.

Donations to the *Library* and *Cabinet*, were announced—from Richard H. Wheatland; N. J. Lord; C. P. Preston, Secretary of Essex Agricultural Society; John S. Ives; James Upton; C. B. Richardson of New York, N. Y.; Portland Society of Natural History; S. M. Worcester; James A. Gillis; Horace Brown; Thomas H. Johnson; Henry M. Brooks; George C. Chase; Stillman Barden of Rockport; Joseph Hammond.

Rev. S. Barden of Rockport, being called upon by the Chair, gave a very interesting and instructive account of his researches among the quarries in Rockport. These quarries have long possessed a great reputation for the excellent building material furnished—specimens of which may be seen in the principal cities of the Union. In the extensive quarries worked by Eames & Co., can be seen some of the best and purest granite in the country. there is almost an entire absence of hornblende. Granite contains quartz, feldspar and mica—sienite, quartz, feldspar and hornblende; frequently the four ingredients are found combined together, viz.: quartz, feldspar, mica and hornblende; hence the rock of this region may be termed sienitic granite.

These quarries exhibit numberless varieties in the coloring of the ingredients; the quartz is shaded all the way from a smoky color to a light watery hue, sometimes tinged with red in a slight degree; the feldspar of a half green color; the mica of an ebony black—occasionally some fine atoms of the red oxide of manganese, and garnets are found

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intermingled. Granite is generally very chary of its contributions of gems; yet we have occasionally veins in which the elements of granite are crystallized in distinct masses, and in a variety of the most fantastic shapes, the quartz being mostly smoky or jet black; the mica equally so; the feldspar, white, buff, and occasionally of the very richest conceivable green. They always crystallize in a matrix of quartz, and can only be successfully extricated by the very greatest care and industry. There have been only some three or four of these more prominent veins opened in the above quarries within the space of some thirty years. Mr. B. has found some seventy different varieties of minerals during his researches.

Mr. F. W. Putnam called the attention of the meeting to the late discovery of a most singular animal in the lithographic stone of Solenhofen, and gave the different views that are entertained in regard to it. This fossil is singular in being a combination of bird and reptile, inasmuch as it is provided with feathers like a bird, while many of its other characteristics are reptilian. The fact of this animal's being provided with wings and with hind extremities, having but three toes and furthermore belonging to the same age as the so called "Bird tracks" of the Connecticut valley and other localities, supports the theory advanced by Professor Agassiz some time ago, that the "bird tracks" were not made by birds but by reptiles which were bird-like in their characters. Professor Wagner has given to this strange animal the name of Griphosaurus, from the Greek word meaning "*enigma*," and "*saurus*," referring it to the order SAURIA in the class of REPTILES.

After some interesting remarks of a general character,—Adjourned.

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Monday, February 9, 1863.

Meeting this evening, A. C. Goodell, Jr., Vice President, in the chair.

Records of preceding meeting read.

Letters were read from Maine Historical Society; C. M. Tracy of Lynn; A. Huntington; F. W. Putnam; H. G. Somerby of Boston.

Donations were announced from the following sources:

To the Library—from W. D. Pickman; James Upton; J. L. Sibley of Cambridge; Mrs. E. A. Putnam; A. Crosby; S. H. Scudder of Boston; Mrs. B. Wheatland; Mrs. L. P. Johnson; H. P. Filer, of Troy, N. Y.; C. W. Upham; A. E. Verrill of Cambridge; Chicago Historical Society; Wm. Mack.

To the Cabinets– from Thos. R. Tannatt, U. S. Army; W. P. Goodhue; William Wyman; George F. Chever.

F. W. Putnam occupied the hour of the meeting in presenting a series of interesting and instructive remarks upon the natural history of the common cod, with some observations on the classification of Fishes. After passing a vote of thanks to Mr. Putnam for his communication, and some remarks from the Chair and others, the meeting adjourned.

Wednesday, February 25, 1863.

Meeting this afternoon at 4 o'clock, adjournment from noon; Vice President A. C. Goodell Jr., in the chair.

The chair presented the following resolutions, accompany-

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ing the same with appropriate remarks in relation to the importance of the subject therein embraced :—

Resolved, That this Society heartily approves the recommendation of His Excellency Governor Andrew, in his inaugural addresses for the years 1861 and 1862, that the Legislature provide for the "collection and publication, under the patronage of the commonwealth, of the statutes enacted between the time of the union of the colonies of Plymouth and Massachusetts Bay, under the charter of William and Mary, in 1691, and that of the adoption of the Constitution in 1780;" and that this Society coincides with His Excellency in the opinion that these statutes "are of inestimable value, on account of their historical interest, their usefulness in throwing light upon subsequent legislation and the assistance which they afford in the determination of many important questions, mooted by the courts," and also in his representations of the extreme scarcity of copies of these early law-books.

Voted, therefore, that the members of this Society are hereby requested to join in any proper measure for the purpose of urging this important subject upon the attention of the Legislature, that they may make the reasonable appropriation required for the publication of said laws.

After remarks from several members the resolutions were unanimously adopted. Adjourned.

Monday, March 9, 1863.

Meeting this evening, the President in the chair.

Records of preceding meeting read.

Letters were read from Massachusetts Historical Society; S. B. Woolworth Secretary of the Regents of the University,

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N. Y.; F. W. Putnam; A. Huntington; A. E. Verrill of Norway, Me.; W. C. H. Waddell, Secretary of American Geographical and Statistical Society, N. Y.

Donations were announced from the following sources:—

To the Library—From Rev. Ray Palmer of Albany, N.Y.; Chicago Historical Society; W. P. Upham; Trustees of New York State Library; James S. Bryant of Hartford, Conn.; Canadian Institute of Toronto; Philadelphia Academy of Natural Science; Miss A. M. Hemmenway of Ludlow, Vt.; C. B. Richardson of New York; George R. Curwen; J. Linton Waters of Chicago, Ill.; Boston Society of Natural History; C. W. Upham.

To the Cabinets—From Capt. Geo. W. Gardner, 24th Reg't Massachusetts Volunteers; Estate of B. Pickman; O. W. H. Upham; Miss Anna Porter; X. H. Shaw; James W. Thompson of Jamaica Plain; George A. Perkins; Lincoln R. Stone, Surgeon 55th Mass. Vols.

Mr. W. P. Upham, read a report up on six orderly books and a letter book, formerly belonging to Gen. John Glover of Marblehead, recently presented to the Essex Institute, by Hon. Robert Hooper of Boston—with the exception of one volume of the Orderly Books, which was in the possession of W. R. L. Ward, Esq., of New York, and forwarded by him a donation to the Library.

The following is a brief abstract of the report:—

These books are in manuscript, the Letter Book, containing copies of letters written by Glover, and the Orderly Books containing the General Orders issued each day from Headquarters during the following periods of the Revolution: from June 29th 1775 to July 26th, 1776, from October 19th

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to November 24th, 1776; from June 28th to October 14th 1778; from March 6th to July 28th, 1779; and from August 3d to November 26th, 1781.

Orderly Books of the Revolution are very rare, and it is doubtful whether there exists in the country another series so complete and well preserved as this. Such books were at the time considered of no value, except for a temporary purpose, and the many accidents and irregularities of camp life caused them in most cases to be poorly kept and soon lost. For the student of American History, nothing could afford so interesting, and at the same time so reliable a source of information.

These books were kept in the 21st Provincial, afterwards the 14th Continental Regiment. This regiment was commanded by Col. John Glover, from the commencement of the Revolution till the 21st of February, 1777, when he was made Brigadier General. From that time till the close of the war, it constituted part of General Glover's Brigade. A sketch of his life, therefore, will serve as a proper accompaniment and illustration of these Orderly Books.

General John Glover was born in Salem, Mass., Nov. 5th, 1732, of a wealthy family that had been established in Salem from its earliest settlement. He removed to Marblehead at an early age, and was there engaged in mercantile pursuits till the outbreak of the Revolution. He then took command of the regiment raised in Marblehead, and on the 15th of June, 1775, marched with them to Cambridge. There he and his regiment had an important share in that series of manœuvres which resulted in the evacuation of Boston by the British.

From the latter part of the year till July 20th, 1776, he was stationed at Beverly to superintend the equipment of the armed vessels that did such service at that time. Under his care were fitted out the expeditions of Selman, Brough-

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ton, Manly and Mugford, and their crews was taken from his regiment, then known as the Marine Regiment.

Glover superintended the transportation of the troops and stores in the evacuation of Long Island, August 29th, 1776, and also the removal of the sick and wounded from New York City to the Jersey shore, on the 14th of September. Here his regiment did service such as none but the men of Marblehead would have had the skill and endurance to perform.

On the 4th of September, he was placed in command of General Clinton's Brigade. On the 18th of October, Glover with his brigade resisted the first landing of the British on the mainland at Frog's Neck, near New York Island. For their conduct on this occasion, they were publicly thanked by Gen. Lee and General Washington.

At the crossing of the Delaware on the night of Dec. 25th, 1776, the Marblehead Regiment again distinguished itself by its heroic daring and enterprise, in managing the boats by which Washington's little army was carried over that broad and rapid river filled with floating ice, to achieve the glorious victory at Trenton.

Soon after this, Glover returned home to Marblehead, and on the 21st of February, 1777, he was appointed Brigadier General by Congress. At first he declined, but afterwards at the urgent request of Washington, accepted the appointment. He was stationed on the Hudson till July 23 d when he joined General Schuyler. He was in the battles of Bemis Heights on the 19th of September, and the 7th of October, and by his bravery and prudence contributed much to the defeat and final surrender of Burgoyne. He was chosen to conduct the captured army, 5,791 in number, through the country to Boston. The following winter he was at Valley Forge, and on the 28th of June, 1778, took

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command on the Hudson, where he had charge of the completion of the forts. In August, he was under General Sullivan, on Rhode Island, and afterwards till July 6th, 1779, commanded at Providence, R. I. June 20th, 1780, he was ordered to Springfield, Mass., to superintend the forwarding of the Massachusetts Militia. The next year he again joined the Army in New York, and remained with it till the surrender of Cornwallis, October 19th, 1781. He was a member of the Court which tried Major Andre. After the war closed he returned to Marblehead, and again became engaged in the fishing trade. He died January 30th, 1797.

Throughout his eventful life he was distinguished for those virtues which most adorn the character of the citizen or the soldier, honest and generous in his dealings with others, a firm patriot, brave, yet modest, a skillful and active commander, and the ever esteemed and honored friend of Washington.

After the reading of the same, remarks were offered by the Chair, and Messrs. C. C. Beaman and A. C. Goodell—and a vote of thanks was passed to Mr. Upham for his very interesting and valuable communication, with a request that a copy be furnished for publication in the Historical Collections. This Report with an abstract of the Orderly Books, is printed in the Historical Collections of the Institute. See vol. v. pages 49—72 and 97—130.

Mr. George D. Phippen read a letter from Hon. Solomon Lincoln, of Hingham, tendering to the Institute a manuscript volume containing "a list of American seamen committed to the old Mill Prison, Plymouth, England, from 1777 to 1781." A vote of thanks, upon his motion, was presented to Mr. Lincoln and others for the valuable donations announced this evening. Adjourned.

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Monday, April 6, 1863.

Meeting this evening, at Creamer Hall, the President in the chair.

Records of preceding meeting read.

Donations announced from the following:—

To the Library—From Cincinnati Mercantile Library Association; C. B. Richardson of New York; Charles Davis of Beverly; Mrs. John H. Stone; George R. Rowe, City Clerk of Lawrence; Vermont Historical Society; John Ward Dean of Boston; L. A. H. Letour of Montreal, C. E.; John A. Innis; Zoologische Gesellschaften, Frankfort, A.M.; C. W. Palfrey; N. J. Lord; Young Men's Association of Buffalo.

To the Cabinets—From John C. Lee; John Robinson; Edward O. Brown; Charles Babbidge, Chaplain 26th Reg't Mass. Volunteers; Wm. A. Williams.

Letters were read from Pennsylvania Historical Society; Corporation of Harvard College; Maine Historical Society; Connecticut Historical Society; L. Agassiz; S. Tenney; Smithsonian Institution; American Geographical and Statistical Society; W. G. Binney of Burlington, N. J.; F. W. Putnam; American Philosophical Society; F. S. Pease of Albany, N. Y.; N. Paine of Worcester.

Rev. Joseph B. Felt read a valuable and interesting communication on "John Endicott, the first Governor," (see Historical Collections of Institute, vol v, page 73.)

Remarks were then offered by Messrs. S. M. Worcester; A. C. Goodell Jr.; G. D. Phippen; C. C. Beaman and the Chair.

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On motion of A. C. Goodell,

Voted, That the thanks of the Institute be presented to Rev. Dr. Felt for the communication read this evening, and that a copy be placed at the disposal of the Publication Committee. Adjourned.

Wednesday, *May* 13, 1863.

Annual Meeting this day at 3 P.M., at their rooms, Plummer Hall, Vice President S. P. Fowler in the Chair.

Records of preceding meeting read.

Donations were announced from the following:

To the Library—from James A. Gillis; N. C. Robbins; B. W. Stone; Miss P. W. Hazeltine of Lynn; Philadelphia Academy of Natural Science; Canadian Institute at Toronto, C.W.; James S. Bryant of Hartford, Conn.; Charles Ward; Asahel Huntington; Thomas H. Lefavour; John L. Sibley of Cambridge; City of Boston; Mrs. James Kimball; Frederick Kidder of Boston; Jeremiah Colburn of Boston; Massachusetts Historical Society; C. C. Sewall.

To the Cabinets—from William Goodhue; S. Barden of Rockport; J. A. Smith; J. P. Cooke Jr. of Cambridge; N. C. Robbins; Caleb Cooke; B. F. Browne.

Letters were read from Pennsylvania Historical Society; Massachusetts Historical Society; Trustees Public Library, Boston; Smithsonian Institution; Trustees of Public Library, Newburyport; J. Henry Stickney of Baltimore, Md.; J. Pearson of Schenectady N.Y.; S. Lincoln of Boston; L. Saltonstall of Boston; W. A. Lander of Danvers; Jacob Batchelder of Lynn; Ward Poole of South Danvers; G. H. Lodge of Swampscott; D. E. Safford of Hamilton; W. B. Rogers of Boston; J. P. Cooke Jr. of Cambridge; C.

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M. Tracy of Lynn; C. C. Binney of Burlington N.J.; S. H. Scudder of Boston; R. Green & Co. of Providence, R.I.; F. H. Lee.

Report of the Secretary was read and accepted.

Report of the Treasurer read, and referred to the Finance Committee.

F. W. Putnam read a report on the condition of the Zoological collections.

From these Reports the following may be specified:

Six members have been stricken from the roll by death; these brief notices, a deserving tribute to their memory, are appended.

1. GEORGE ANDREWS, son of John H. and Nancy (Page) Andrews, born in this city March 11, 1824—was prepared for the University at the Latin School, then under the charge of Oliver Carlton, graduated at Harvard College in 1847—studied the profession of the law in the office of A. Huntington of Salem, from July 14, 1847 to Sept. 25 1848, and from July 18, 1849 to June 19, 1850—in the interval at the Law School in Cambridge — was admitted a member of the Essex Bar June 20, 1850. He always took a deep interest in all educational movements and was for several years an active and useful member of the School Committee. He was an Associate Justice of the Salem Police Court; a Representative of the Massachusetts Legislature from Salem in 1859. His death occurred August 26, 1862. The city thereby has lost a conscientious, faithful, and upright man and our literary, scientific and educational institutions, a kind and sympathizing friend.

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2. NATHANIEL AUGUSTUS KIMBALL, son of Nathaniel and Sarah (Knight) Kimball, was born at Plaistow, N. H., May 5, 1822; and was educated at the academies in Atkinson and Plaistow, N. H.. In early life he came to this city, engaged in mercantile pursuits, and for several years in connection with his brother was an enterprising and active merchant. He died at Salem, August 27, 1862.

3. CHARLES F. WILLIAMS, JR., son of Charles F. and Sophia (Silver) Williams, was born in this city, March 25, 1842, and was educated at the public schools, where he always sustained a character for good scholarship and conduct. After leaving school, he went as clerk in an extensive Dry Goods store, and was there quietly pursuing this occupation when the outbreak of the rebellion took place. At the first call for volunteers in April 1861, he went as corporal in the Salem Light Infantry, Co. A., 8th Reg't Mass. Vols., and performed three months of efficient service. He then resumed his former occupation until he received the appointment of Lieutenant in Co. F., (Capt. S. C. Oliver,) 35th Reg't Mass Vols., and again entered the service of his country; after an absence of only a few weeks he fell wounded in the gallant discharge of his duties in the battle of Antietam, on Wednesday, Sept. 17, 1862, and died at Middletown, Md., on the 23d of that month, in consequence of his wounds. He was one of our most estimable and respected young men, and his loss will be deeply felt and deplored by a large circle of friends.

4. JOHN HUBBARD STONE, son of John and Catharine (Dodge) Stone, was born at Salem, Sept. 9, 1809, married August 31, 1837, Elizabeth Flint, daughter of Addison and Sally (Upton) Flint of Reading, (see Flint's Genealogy, page 97.) He was educated to a mercantile life—had been for several years Clerk in the Adjutant General's office in

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in this State; and also received the appointment of an Inspector in the Salem Custom House during the administration of President Pierce. For several years past he has devoted his attention to Genealogical investigations, and printed in connection with John Flint, "a Genealogical Register of the descendants of Thomas Flint of Salem," in one volume, octavo. He also contributed freely to various articles in the Historical Collections of the Institute. He was elected Librarian in May, 1856, and has been successively elected to that office at each annual meeting, and was engaged in the preparation of of a catalogue of the Library, when sickness and death prevented him from the completion of this undertaking. He always took a very active and deep interest in all the departments of the Institute, and we have thereby lost a valued and good friend. He died of Erysipelas, Nov. 17, 1862.

5. CHARLES FISKE PUTNAM, son of Ebenezer and Betsey (Fiske) Putnam, was born at Salem Oct. 19, 1802. He married Sarah daughter of Daniel and Deborah (Silsbee) Sage, she survives. He was educated to the occupation of a druggist, and for many years kept an extensive druggist's establishment in this city. For the last twenty or twenty-five years he has devoted his attention to the cultivation of fruit, has been a very successful horticulturist, and has contributed largely to all our Horticultural Exhibitions, the specimens shown were always very fine and attracted a merited degree of attention. He died at his residence in this city after a long and lingering illness, Dec. 31, 1862.

6. WILLIAM BROWN, son of David and Hannah (Preston) Brown, was born at Salem, Dec. 22, 1802. He served the apprenticeship of printer in the office of the Salem Register, and was for many years connected with the press both in the Gazette and the Register offices. He was appoint-

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ed Naval Officer at this port, under General Taylor's administration in 1849—and at a later period a Clerk in the Adjutant General's office of this State. Since the commencement of the Rebellion, the duties in the Adjutant General's department have greatly increased and the office of Assistant General was thereby created—and Mr. B. received the appointment. The labor assigned to him he performed with great fidelity and faithfulness, and the closeness of this application probably hastened his departure. His genial and social disposition won for him a host of friends; though not an active member, he always took great interest in the success of this Institution. He married June 26, 1825, Rebecca Upton Wright. He died in Boston on Monday Feb. 16, 1863, aged 60—to which city he removed a few years since.

MEETINGS.—Four Field Meetings were held during the past season, at the Ship Rock in South Danvers, Rockport, Hamilton Ponds, and Rowley. They were all fully attended, especially the meeting at Rockport, which was the largest of any of these meetings held under the auspices of the Institute. Eight Evening meetings during the winter months —and ordinary meetings for the election of members as usual.

LECTURES.—A course of six lectures on Scientific subjects have been delivered during the present Spring, viz:

1. Prof. L. Agassiz on Monday March 16—"Plan in Creation."
2. S. Tenney, on Monday March 23, on "Antiquity of the Earth."
3. C. M. Tracy, on Monday March 30, on "Weeds."
4. Prof. J. P. Cooke, Jr.—on Monday April 13, on "Analysis of the Sun," with experiments.

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5. F. W. Putnam, on Monday April 20, on "Fishes."

6. Prof. W. B. Rogers, on Wednesday May 13, on "Application of Science to the Arts."

These lectures were well attended and a desire has been expressed that other courses should be hereafter arranged.

PUBLICATIONS.—One volume of the Historical Collections; and the third part of vol. ii. of the Proceedings, have been printed, which concludes that volume.

DEPARTMENT OF NATURAL HISTORY, continues to receive a merited degree of attention. Forty-one donations have been made in *Zoology*, as follows:—Mammals, 5, Birds, 7, Reptiles 8, Fishes 4, Mollusks 6, Articulates 7, Radiates 2, Fossils 2, several of these donations comprise a large number of specimens and species, many of which were new to the Cabinets.

During the year much has been done in the arrangement of the specimens; the Birds have been catalogued and numbered, and the North American species identified and labelled—those indigenous to the county of Essex have been brought together and placed in separate cases. A visitor to the rooms can now form a very good idea of the number and appearance of the birds of this County, for we have representatives of nearly all the species found within its limits. It is proposed to adopt this plan in the arrangement of the other classes and endeavor to procure specimens so that the Fauna of the County shall be fully represented in our collections.

The Mammals have been catalogued and to a certain extent identified and labelled. That of Reptiles, Fishes and Insects have been commenced. The Radiates, by the assistance of Messrs. A. Agassiz and A. E. Verrill have been fully identified, catalogued and labelled.

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The interchange of specimens with the Museum of Comparative Zoology has been continued with equal benefit to both Institutions.

A full series of our Foreign Serpents has been sent to Prof. Jan of Milan for identification. These he has examined and returned with the exception of two or three specimens, types of new or imperfectly known species which he has retained for a short time for the purpose of having them figured in his forthcoming work on Serpents.

One of our members, Caleb Cooke, for three years a resident at Zanzibar, has contributed many interesting botanical specimens collected at that place. A curious growth of wood found among some slabs at one of the wharves—from Maine, by Benjamin Felt.

The most prominent of the contributions to the collections of Mineralogy are specimens of Green Feldspar (crystalized) and Quartz in variety from Rockport; presented by Rev. Stillman Barden. A plan has been adopted in the arrangement of the specimens in this part of the collections, similar to that of the Birds, in placing those found in Essex County in separate cases.

THE HISTORICAL DEPARTMENT has been enriched by portraits of Capt. John Carnes one of the early navigators to the East Indies from Salem, and, who is said to have command of the first vessel to the coast of Sumatra,—presented by W. P. Goodhue; also of Col. Benj. Pickman, the second President of the Essex Historical Society, by the family;—a view of the Court House in Salem, removed in 1839, painted upon an old fire-board—from C. W. Upham; a photograph of sybil Swinnerton, from Miss Ann Porter; also of Washington, from David Nichols.

From E. C. Brown, Bow and Arrows, from Fejee Isles.

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H. F. Shepard, Coins. J. W. Thornton of Boston, W. L. Welch, Henry Merritt, Geo. W. Gardner, Reuben W. Ropes of Brooklyn, N.Y., Thomas K. Tannatt, John Robinson, War Relics. Mrs. I. Ward, specimen of thread &c., manufactured from the fibre of the common Milkweed, by Miss Margaret Gerrish, some thirty years since. L. Peirson Ward, a Mirror, from Japan. Rufus Wendell, a piece of the Charter Oak, at Hartford. John S. Annable of Hamilton, Indian Axe, Gouge and Chisel. Joseph Hammond, a copper Kettle, from Japan.

Among the manuscripts donated may be mentioned the Orderly Books of the late General Glover, from Robert Hooper and W. R. L. Ward. Book of Births kept by the late Dr. Richard Hazeltine of Lynn, from his daughter Miss Phebe W. Hazeltine.

THE LIBRARY continues to receive many valuable additions. Number of vols. received:

Folios, principally Newspapers, 47; Quartos, 8	55	
Octavos, and lesser fold	421	
		476
Serials, 595; Pamphlets, 364		959
		1435

The above have been contributed by 114 different Institutions and Individuals. The exchanges with other societies continue to increase, and we trust that ere long, a regular systematic exchange will be established with the leading Institutions of this country.

HORTICULTURE. During the past season three monthly Exhibitions of Fruit, Flowers and Vegetables were held; the first on Friday, June 27; second on Friday, July 25; third on Friday August 22. The Annual display took place on Wednesday, Thursday and Friday, September 22, 23 and

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24, and was one of the best ever exhibited. There has been, in some former years, a larger number of varieties but never more splendid fruit or such fine vegetables. The most experienced and skilful connoisseurs and practical horticulturists selected the following list of fourteen Pears from the exhibition, which have in their growth this year surpassed that of all former seasons, viz:—Monsieur le Cure or Vicar of Winkfield; Beurre Diel; Marie Louse; Belle of Flanders or Flemish Beauty; Belle Lucrative or Fondante d'Automne; Paradise of Autumn; Louise Bonne de Jersey; Beurre d'Amaulis; Easter Beurre; Glout Morceau; Doyenne Boussock; Bartlett; Beurre Bosc; Winter Nelis.

The crops were very abundant, and all kinds of fruit plenty. Seldom do we have our markets so well supplied with choice kinds of Fruit and at so reasonable prices.

THE TREASURER presents the following statement of the Financial condition for the year ending May 1863:—

GENERAL ACCOUNT.

Debits.

Athenæum, Rent, one-half of Fuel, Attendance, &c.	$460 37
Printing, $7 62; Gas Light Co., $7 46,	15 08
Expresses and Postages,	18 88
Printing Collections and Proceedings,	713 67
Expenses of Lectures and Meetings,	103 95
Historical Account,	9 00
Natural History and Horticulture account,	31 52
Sundries,	22 83
Treasurer balance due on previous account,	18 92
Balance on hand,	39 36
	$1,433 58

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Credits.

Dividends Webster Bank,	35 00
Assessments,	590 00
Proceeds of sale of Publications,	458 98
Proceeds of Lectures,	293 05
Sundries,	56 55
	$1,433 58

HISTORICAL ACCOUNT.

Debits.

Binding, 70 47 ; Books for Library, 9 33	79 80

Credits.

Dividends Naumkeag Bank,	12 00
Coupons Mich. Central R. R. Bonds,	58 80
General Fund,	9 00
	$79 80

NATURAL HISTORY AND HORTICULTURE ACCOUNT.

Debits.

Preservatives, &c., 14 88; Books, 12 00	26 88
Horticultural Exhibitions,	124 90
	$151 78

Credits.

Dividends Portsmouth, Saco and Portland R. R.	12 00
Dividends Lowell Bleachery,	40 00
Horticultural Exhibitions,	66 76
General Fund, 31 52 ; Sundries, 1 50	33 02
	$151 78

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The following were elected officers for the year ensuing and until others shall be chosen in their stead:

President.—A. Huntington.

Vice Presidents.—Of History, Abner C. Goodell, Jr.; of Horticulture, James Upton; of Natural History, S. P. Fowler.

Secretary and Treasurer.—H. Wheatland.

Librarian.—N. J. Holden.

Cabinet Keeper.—R. H. Wheatland.

Finance Committee.—John C. Lee, R. S. Rogers, H. M. Brooks, G. D. Phippen, J. Chamberlain.

Library Committee.—J. G. Waters, D. Roberts, A. Crosby, H. J. Cross.

Publication Committee.—A. C. Goodell, Jr.; H. Wheatland; C. M. Tracy; Ira. J. Patch; G. D. Phippen; W. P. Upham.

Curators of Natural History.—Botany, C. M. Tracy; Ornithology, Thomas M. Pond; Articulata, James H. Emerton; Radiata, C. Cooke; Geology, H. F. Shepard; Mammalogy and Ichthyology, F. W. Putnam; Herpetology, R. H. Wheatland; Comparative Anatomy, H. Wheatland; Mollusca and Paleontology, H. F. King; Mineralogy, Charles H. Higbee.

Curators of History.—Ethnology, W. S. Messervy, M. A. Stickney, John Robinson, C. F. Nichols; Manuscripts, W. P. Upham, G. L. Streeter, S. B. Buttrick, Henry. M. Brooks; Fine Arts, Francis Peabody, Joseph G. Waters.

Curators of Horticulture.—Fruits and Vegetables, James Upton, John M. Ives, J. F. Allen, J. S. Cabot, R. S. Rogers, G. B. Loring, John Bertram, S. A. Merrill;

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Flowers, Francis Putnam, W. Mack, C. H. Norris, G. D. Glover, B. A. West.

Voted, That a Committee be appointed to arrange for the Evening Meetings the ensuing winter, also to consider the expediency of having a course of Lectures on some subjects appertaining to the objects of the Institute—and if in the affirmative, to make all necessary arrangements in relation thereto. Messrs A. C. Goodell Jr., Francis Peabody, G. D. Phippen, E. B. Willson, James Kimball, F. W. Putnam, and George Perkins, were appointed on said Committee.

Voted, That a Committee be appointed to arrange for Field Meetings the ensuing season if expedient. Messrs. A. W. Dodge of Hamilton, C. M. Tracy of Lynn, S. P. Fowler of Danvers, S. Barden of Rockport, C. C. Beaman, J. M. Ives, and C. H. Norris of Salem, were appointed on said Committee.

Voted, That the Curators of Horticulture be authorized to hold such Exhibitions of Fruits, Flowers and Vegetables during the ensuing season as they may deem expedient.

Voted, That F. W. Putnam be requested to act as an assistant to the Cabinet Keeper for such time as his services may be required. Adjourned.

Wednesday, June 10, 1863.

Field Meeting at Swampscott.—The day was fine and very favorable for out-door rambles. Some went to the beaches and collected specimens of the Mollusca, &c., and others to the woods near by gathering a variety of plants.

The afternoon session was held at the Town Hall and was called to order at 3 P.M., by A. C. Goodell Jr., one of the Vice Presidents, who opened the meeting with an appro-

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priate allusion to the ancient dwellers of Swampscott, whose names have become a part of the history of the town, also of the events which occurred in the early settlement.

Records of the preceding meeting read.

Donations received since the Annual meeting of the 18th ult. were announced:

To the Library—from Mrs. Lucy P. Johnson; Samuel Johnson Jr.; Saint Louis Academy of Science; Philadelphia Academy of Natural Science; H. J. Hastings of Albany N.Y.; New Jersey Historical Society; N. Paine of Worcester; Charles Stephens of Beverly; William Mack; Charles F. Nichols; Joseph Willard of Boston; H. I. Bowditch of Boston; California Academy of Natural Science; C. B. Richardson of New York.

To the Cabinets—from C. F. Nichols; T. M. Pond; C. H. Higbee; John Robinson; John Prescott of Grafton N.H.; George Killham; Museum of Comparative Zoology at Cambridge; S. Jillson of Feltonville; Geo. G. Creamer.

Letters were read from Maine Historical Society; Trustees of Boston Public Library; S. P. Fowler of Danvers; S. A. Green, Surgeon 24th Reg. Mass Vols.; Nath'l Paine of Worcester; S. Barden of Rockport; Allen W. Dodge of Hamilton; Charles Dean of Boston; Joseph Willard of Boston.

Prof. L. Agassiz of Cambridge, being called up by a graceful allusion made by the Chair, spoke of the boundlessness of investigation, and the importance of studying common things. Nothing, he said, is so instructive as the continued study of those things we know most of. The more we examine Nature, the more she suggests to us. He spoke of his recent

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experiments, made with a view of ascertaining the age of animals and especially of his study of the habits of the common marine snail, (Natica Heros), found upon our beaches. He desired to ascertain, if he could, its rate of growth, and for that purpose had gathered about a thousand specimens of various sizes, within a few days. These he had assorted, and found to be easily divided into groups, each group being of a certain definite size, and there being none of intermediate growth. He had previously ascertained that snails always spawned at the same time, once a year, and that the process continued but a few days. He therefore knew that each of his groups of snails—those of the same size—were of the same age, having commenced growing at the same time; and having grown under precisely the same circumstances, were therefore so much alike. He thus ascertained the various ages of the Naticas found together upon one beach from those of one or two years up to those of twenty-five or thirty years—the latter being the age of the largest snails usually found upon the beach. He also noticed rings or transverse lines upon the snail shells, more distinctly marked than the ordinary lines of growth, the number of which indicated very nearly their age; for these lines coincided with the ordinal number of the different set of specimens arranged according to their size. He had thus, he thought, ascertained the rate of growth of these shells. A comparison with other families however, shows a widely different result. Among the larger land-snails, (Helices), some species may reach in one year the dimensions which a Natica takes from ten to fifteen years to attain. Again, some of our Unios, such as U. cylindricus, require at least fifteen years to acquire their full size, while our Pinnas reach to their full dimensions in seven or eight years. It is by a similar process, he said, that we

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are to ascertain the age of the earth. An examination of the several deposits that form the crust of the earth shows that they are composed of certain vegetable and animal productions, and having ascertained the rate of growth of each, it may become a simple sum in addition to tell how old the earth is. An examination of the delta of the Mississippi disclosed eleven different deposits of trees, each of which were from six to eight hundred years old, and each must have grown on the same spot; and yet they only composed a depth of not many feet. Some birds and animals have a very rapid growth, while others are very slow. A speckled turtle, for instance, has scarcely reached half its growth in eleven years. Prof. Agassiz dwelt at length upon the importance and value attached to the study of common things, The more we know of Nature, the more suggestive she is. Like an old friend, she opens her heart to us freely, if we seek a thorough acquaintance with her.

Prof. A. Crosby of Salem, inquired whether the same rule of classification spoken of in the case of snails would apply to vertebrate animals.

Prof. Agassiz said he had not fully investigated that point. He had just set some children at work to catch all the sculpins they could, in order that he might make the test. He was of the opinion, however, that vertebrate animals of the same kind born at precisely the same period, and living under precisely the same circumstances, would all grow nearly to the same dimensions during the same time. The difference in the size of human beings is in a great measure owing to the different circumstances under which they are born and live. He spoke of the great

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difficulties attending an examination of the early development of the Natica.

Mr. F. W. PUTNAM of Salem, said he had found the rule spoken of to apply to toads, and Mr. A. E. VERRILL of Cambridge, spoke of his investigations in regard to a species of the salamander.

Prof. WILLIAM RUSSELL of Andover, being called upon, said his investigations in science were in a different direction—being the application of æsthetics to the cultivation of the voice. Upon repeated urging, he came upon the platform and delivered a beautiful poetic apostrophe to the Supreme Being, having first, in imagination, taken his hearers to the grand old woods.

Mr. J. M. IVES of Salem, spoke of the habits of that singular and interesting bird, the republican or cliff swallow, whose nests are found so often under the eaves of buildings. He mentioned instances of almost human display of reason exhibited by birds in the care of their young.

Prof. RUSSELL related anecdotes of birds, and the curious nests which they sometimes build, showing that they do deviate from their established habits, under some circumstances, notwithstanding the assertion of certain naturalists that they do not—one of a golden robin which had appropriated a child's stocking and ingeniously constructed it into a nest, and another of a bird which appropriated a lady's white collar, worth five dollars, for the same purpose. He thought they were governed by instinct more than by fixed habits.

Allusion having been made, in some of these anecdotes, to

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instinct and reason, Gen. H. K. OLIVER of Salem, said he had often wondered where instinct left off and reason began ; and related some facts connected with the Natural History of the honey bee, whose habits he had closely watched for sixteen years in hives, in his own garden. He also related some interesting details recorded by English and French Apiarians, showing a manifest deviation from the promptings of mere instinct. In one case, when a snail had obtruded his presence into a hive, the bees had, with a gummy substance covered over the orifice, and thus sealed the animal within his shell. When a common slug made a similar intrusion, he being a soft animal, was sealed up by being covered over completely. The question occurred to him why should not the bees, in the first instance, have covered shell and all ? How should they know that that course would not be necessary to protect themselves from the disagreeable odor of a dead animal ? Gen. O. likewise told a curious story (and a true one,) which was related to him by the late Rev. Dr. Flint of Salem, who was a personal witness of the proceeding, and vouched for its correctness. It is a well known fact that in early fall, the working bees clear all the drones entirely out of the hive, drag them away and kill them. They more frequently worry them to death, than kill them by stinging. Dr. Flint, on an occasion of this "slaughter of the innocents," in his own hives, one day sat down by a hive to watch the process, and assist, perhaps, in this big job of extermination by despatching the drones as they were brought out. This he did with a spear, or needle inserted in the end of a stick. As the bees came struggling out with a drone, the Doctor would despatch the victim at once. Having followed this up some time he waited to observe what effect his proceeding would have ; and he found that the bees, instead of proceeding with their work of worrying

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the drone to death, as they did before he assisted, *simply remained holding on to the drone and waited patiently for him to finish the operation*—travelling back for another victim when he had despatched the last. Gen. Oliver said this story seemed almost incredible, and he should not have believed it himself had not Dr. Flint assured him that it was a positive truth which came under his own personal observation. Was there not here a manifest reasoning?

Prof. AGASSIZ said that, in reference to the relation of instinct to reason, he could simply give his own opinion, which was, that there is no essential difference between the two—his idea being that, while there may be what is called instinctive action as distinguished from that resulting from the deliberate exercise of reason, both were actuated by the same influences. The difference in the influences which actuate the lower animals and those which govern man, he considered difference in degree rather than differences of kind—the one having in an undeveloped condition what the other has in a perfect state.

Mr A. E. VERRILL spoke of the changes of the habits of sea-gulls in the Bay of Fundy, who, from having been often robbed of their eggs, have ceased laying them upon the rocks and sand, and taken to the highest trees. In cases where the robbing has been stopped by legal enactment, the gulls have returned to lay their eggs upon the rocks.

Messrs. IVES and PUTNAM alluded to the practice of the yellow bird who resort to ingenious methods to protect themselves from the encroachments of the cow bunting.

HENRY WHEATLAND alluded to the recent decease of Dr.

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George Osgood of Danvers which took place at his late residence on the 26th of May, 1863, after a short illness. His great love for botanical studies, which were commenced under the auspices of the venerable Rev. Dr. Cutler of Hamilton, and his great interest in these Field Meetings, entitle him to some notice—therefore

Voted, That Messrs. S. P. Fowler and G. D. Phippen be a Committee to prepare a memorial of the late Dr. G. Osgood of Danvers, also, a series of resolutions to be transmitted to the family of the deceased.

Voted, That the thanks of the Institute be presented to the Selectmen of Swampscott for the use of this Hall, also to Prof. Agassiz and other gentlemen who have favored the meeting with instructive and interesting remarks. Adj.

Thursday, June 25, 1863.

FIELD MEETING, this day, at Amesbury, one of the loveliest of June days. The people, and more especially the Agricultural and Horticultural Society of Amesbury and Salisbury were very hospitable, furnishing vehicles and skillful and intelligent guides to conduct the visitors to all the numerous points of interest. Some went in search of the antique and visited several sites memorable not only in the annals of these towns, but of the county, state and country;—others fond of natural scenery or some of the branches of Natural History went to Kimball's Pond, and were there rewarded in finding several rare plants and insects, specimens of which were collected for the Cabinets of the Society. A pleasant drive to several of the other villages of Amesbury, and along the banks of the beautiful Merrimac closed the forenoon's excursion.

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The afternoon session was held in the First Congregational Church, at 2 30 P.M. S. P. Fowler of Danvers, one of the Vice Presidents, in the Chair.

Records of the preceding meeting read.

Donations received since the last meeting were announced:—

To the Library—from Henry Wilson, U. S. Senator; Chicago Historical Society; Redwood Library and Athenæum at Newport, R.I.; L. A. H. Latour, Montreal, C.E.; American Antiquarian Society; Thomas Stimpson of South Danvers; G. F. Read; Mary E. Jocelyn; Albany Institute; G. C. Chase; Thomas H. Johnson; New York Mercantile Library Association; E. M. Stone of Providence, R.I.

To the Cabinets—from R. S. Rogers; J. H. Emerton; C. H. Higbee; John Robinson; W. Palmer; H. M. Brooks; Thomas M. Pond; George Kilham of Boxford; N. Vickery of Lynn.

Letters were read from Joel Munsell of Albany; John G. Whittier of Amesbury; C. M. Tracy of Lynn; A. E. Verrill of Cambridge; C. W. Felt; Pennsylvania Historical Society.

H. Wheatland of Salem, gave a brief history of the Institute, and the origin of these Field Meetings; the first having been held at Danvers in June 1849.

G. D. Phippen of Salem described several of the thirty-seven species of plants collected by the party, spoke of the adaptation of some of them for cultivation in our gardens, and suggested the importance of devoting more attention to this branch of horticulture.

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Hon. Allen W. Dodge of Hamilton, read a list of the plants and shrubs found in Amesbury and Salisbury, presented by Mr. Whittier. He also said, the field meetings of the Institute possessed one interesting feature, in the fact, that every trade and profession was represented, thus showing that whatever else might principally engage their attention, yet they found time to devote to the study of nature, and it was really astonishing how much may be learned by persistent application. As an illustration of this he referred to his own experience in a particular department of agriculture—the nursery enterprise—in which he flattered himself that he had been the instrument of good to the people of the county, in many parts of which he could recognize fruit trees that had passed through his hands. He hoped that, in this regard, the world was better than when he found it. He then paid a deserved tribute to the excellent Horticultural Society in Amesbury. Mr. Dodge had noticed with interest and concern that, in our vicinity, several kinds of fruit seem to be now hardly worth cultivating. The Plum appears to have seceded, the Cherry is feeble, and it was a rare thing to get a Rare-Ripe. Pears were abundant and excellent last year; this year they do not promise so well. Quinces, once so popular for preserves, had been superseded by the Cranberry. It was for the interest of the farmers of the county to make the best of what they have left. Small fruits, such as Currants, Raspberries, &c., might be profitably cultivated. Gooseberries he did not consider so important. As to Strawberries, he would say that he had taken some exercise in weeding them, and that he considered them cheap at twenty-five cents a box.

Mr. J. J. H. Gregory, of Marblehead, said a few words relative to the Strawberry culture, recommending the

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system of raising them in hills instead of the common method of beds. He then took up his favorite topic of Geology and gave a description of the soil, rocks, &c., found in the town.

A. C. GOODELL, Jr. Esq. of Salem, being called on by the Chair, said he rose cheerfully, to give an account of what he had seen, in the delightful journey he had, to day, made through Old Salisbury and this, her neighboring town. And yet he could not but regret that, in the absence of the Rev. Dr. Felt who, it had been hoped, would have prepared a paper on the history of these towns to be read at this meeting —this subject could not be more fully and satisfactorily discussed than in the remarks which he proposed to offer.

He then proceeded to say that a company of nine gentlemen, accommodated in two carriages, driven by Mr. True and the Hon. Streeter Evans, composed the party of which he had the pleasure of being a member, and which started on its tour from the East Salisbury station immediately after the arrival of the train. On the way a conversation ensued as to the origin of the names of these towns; and Mr. Evans suggested that, as Salisbury contains no ponds within its limits, it may have received its name from its resemblance in this particular to Salisbury in Wilts, in England. But the speaker thought this conjecture hardly satisfactory, inasmuch as Salisbury in 1640—the date of its incorporation,—included the present town of Amesbury, which contains several ponds. He was inclined to believe that its name was changed from Colchester, its earlier name, in remembrance of the English home of some of its earliest leading inhabitants—perhaps, as some have supposed, the Rev. William Worcester, its first minister, or more likely, Christopher Batt, who was from Salisbury in England,

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and who was a representative in General Court from the town of Salisbury, when the name was changed in 1640. The farm of Mr. Batt had been pointed out to-day by Mr. Evans.

Salisbury, in Wiltshire in England, sometimes called Old Sarum, is a town of great antiquity, and the etymology of its name is involved in great doubt, though Camden is inclined to trace it to *Sorbio-* or *Sorvio-dunum* which, in the ancient language of Britian, signifies a dry hill—a name which, on account of its high and barren situation, was quite appropriate in the earliest times, if we may believe the Old Latin distich which is translated thus:

> "Water's there scarce, but chalk in plenty lies,
> And those sweet notes that Philomel denies,
> The harsher music of the wind supplies."

South of Old Salisbury is the famous Salisbury Plain, memorable not only for its curious Druidic stones, known as Stonehenge, but as the scene of Hannah More's touching story of the Shepherd of Salisbury Plain. North of Salisbury, on the river Avon—not the Avon in Warwickshire, on which is Stratford where lie the remains of Shakespeare, but another river of that name flowing southwardly into the British Channel—is Ambresbury or Amesbury, from which our town of Amesbury takes its name. The origin of this name is more certain than that of Salisbury, being traced to Ambrosius Aurelianus, a British king, who died about the year 508, and who gave name to the place, which is strictly Ambrose-bury, that is, Ambrose's-town; and hence the old-fashioned pronunciation of the name as *Ams*bury is, etymologically, more correct than the modern pronunciation of *Ames*bury.

Amesbury was set off from Salisbury in the year 1668.

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The speaker then went on to describe the interesting localities pointed out by their intelligent guide, such as the site of the first meeting house in Salisbury, the site of the old Court House, and of the dwelling-house of the Clerk of the old Norfolk County Courts, and other places.

In the old grave yard, said the speaker, we were shown the grave of Rev. WILLIAM WORCESTER, the first minister of Salisbury, and the ancestor of Noah Worcester, the distinguished philanthropist, of Joseph E. Worcester, the eminent lexicographer, and of the late Rev. Dr. Samuel Worcester, of Salem; also the grave of his successor, the Rev. JOHN WHEELWRIGHT, who is distinguished for his persistent advocacy of the cause of Anne Hutchinson, and for the persecutions he endured therefor. Anne Hutchinson, the speaker thought, had not been fairly dealt with by historians, who have not sufficiently brought to light her exalted character, and have not done her the justice to place her at the head of the most spiritual school of New England's religious teachers. She was the precursor of the Friends; and was the first to announce the necessity of certain inward experiences which are now generally considered the essential marks of "conversion" by evangelical sects. Two Boston clergymen were her especial defenders—John Cotton and John Wheelwright. The former wavered in his adherance to the cause of Mrs. Hutchinson, who was afterwards banished from the Colony, and fled to the Dutch settlements west of New Haven, where she was murdered by the Indians. Wheelwright, however, whose wife was a sister-in-law to Mrs. Hutchinson, always defended her, was banished therefor, and founded Exeter in New Hampshire. He removed afterwards to Wells, and having been re-admitted into the Colony, was still later settled in Salisbury, and died here Nov. 15, 1679. He was the college classmate and friend of

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Cromwell, and was in England some time during the Protectorate.

These graves were covered with large, flat, rough stones lying horizontally and bearing no inscription.

The Secretary had alluded to the fact that this was the first meeting of the Institute ever held in old Norfolk County; and this brought to the speaker's mind another name intimately connected with the history of that County, which comprised within its limits Hampton, Haverhill, Salisbury, Exeter, Dover and Strawberry-bank (now Portsmouth,) and which was made a separate County in 1643. The name referred to was THOMAS BRADBURY, the old Norfolk County Recorder and Clerk of the Courts. He was in this country as early as 1634, married a Mary Perkins, of Ipswich, in 1636, and afterwards removed to Salisbury, where he remained till his death, which took place in 1695. His wife, during that mental epidemic, the witchcraft delusion, which the speaker thought identical in its nature with modern spiritualism, was one of the accused; but was acquitted chiefly through the untiring exertions of her devoted husband and the earnest remonstrance of nearly every person in town, many of whom had been her neighbors for more than fifty years, and were shocked that so good a mother, wife and neighbor should be accused of so horrible a crime. She survived her husband about five years.

Bradbury was one of the leading men of the colony yet no monument marks his resting place, or that of his wife, and only a grassy hollow indicates the site of his mansion house, and no trace remains of the old Court House where he so many years officiated. His records are to be found in the Registry of Deeds at Salem. They begin in 1648 and end in 1691.

The town of Salisbury was famous, as being the place

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where in 1737 assembled the General Court to confer with the Legislature of New Hampshire concerning the boundary line between the two provinces. This boundary line had long been in dispute, from the fact that the Massachusetts Patent described the northern boundary of its grant as on a line running "three miles north" of the Merrimack river, thus conflicting (through ignorance respecting the course of that river which was supposad to run due east) with the claims of other grantees. It was finally settled, in 1740, upon its present location. We were shown the house, still standing, in which, it is said, the General Court assembled. The New Hampshire Legislature sat at the same time in Hampton.

Before and during the existence of the county of Norfolk, New Hampshire had been under the dominion of Massachusetts, and for many years there was much objection to a separation of New Hampshire into a distinct province. This was accomplished, however, in 1680. John Cutt or Cutts was made the first President and ELIAS STILEMAN the first Secretary.

Mr. Stileman was from Salem where he had been Clerk of the Court, Register of Probate, &c. He was one of the earliest opponents of a separation from Massachusetts, but notwithstanding this he rose to the position of Deputy Governor, and, throughout his life, was one of the chief men of the new Province.

The Speaker forbore to mention the names of some men of great distinction who have lived here in later times, but would refer to one of his predecessors in office, who had been brought to mind to-day as the speaker stood looking over the extensive marshes between the river and some parts of the town. On those marshes, in Dec. 1722, Daniel Rogers of Ipswich, then Register of Probate for Essex County, who had been to Salisbury on some official business, lost his way

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to the ferry, and, straying about in a blinding snow-storm till completely exhausted, he fell and expired. His remains were deposited in the old High street burying-ground in Ipswich, and his grave stone bears a Latin epitaph indicating the manner of his death, which may be translated thus :—

> The boisterous north wind with unstable force
> Restrains the anxious seamen from their course,
> Yet, sun-led through the seas, this northern blast
> Impels them to their destined port at last.
> So me the Boreal wintry storm has blest,
> Borne by its fury to eternal rest;
> The Sun of Righteousness attracts my eyes,
> And guides me havenward, beyond the skies.

One Moses Gatchel, who lived near the place of his death, was arrested on suspicion of having murdered him, but no bill of indictment was found against him by the grand jury.

Much more might be said of the early inhabitants of this town,—of the exploit of a townsman, Major Robert Pike, one of the greatest soldiers in our Colonial history,—of the Indian troubles, &c.; but the lateness of the hour would not permit. On a suggestion of the Rev. Mr. Beaman, the speaker said he was reminded of a piece of information he had received to-day, that he knew would be gladly received by many, and that was the fact that the old church records which Mr. Newhall, in his excellent "Essex Memorial,"—published in 1835—declares to have been lost up to the year 1816, are still in existence, in the possession of the Hon. Caleb Cushing at Newburyport, and were, probably, preserved among the family papers of his ancestor, the Rev. Caleb Cushing, who was settled over the First Church, in Salisbury in 1698, and died here in 1752. It is to be hoped that this information is correct, as those records are of great historical value.

Wm. C. Binney Esq., of Amesbury, said the people of his town were happy to receive a visit from the Essex Institute.

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Amesbury had its Horticultural Society, which had been instituted, not as as a rival or competitor of the County Society, but as a means of developing the resources of the locality. Their Society had proved a success, and he would be glad to welcome the Institute to their exhibition next Fall. Last year's exhibition showed that good stone fruit can be raised in the vicinity, and fine cherries and plums were presented. The trees manifested little if any effects of canker worms.

Rev. Mr. BEAMAN of Salem, who had been one of the party that visited the ancient relics, added to the statement of Mr. Goodell the fact that he had that day seen the first communion-service of the church in Salisbury, two flagons and a baptismal bason of pewter, procured in London two hundred-years ago. Also, four large folio volumes, of 600 pages each, of Richard Baxter's practical works, presented to the "Congregation of Protestant Dissenters, at Salisbury, in the county of Essex, in New England, who are at present under the charge of the Rev. Mr. Caleb Cushing." In the burial-ground the following inscriptions were thought worthy of notice. On one stone: "Here lies interred what was mortal of ye reverend Mr. James Allen, late teacher of the gospel and pastor of ye church of Christ in Salisbury, who died March 7, 1695, in the 37th year of his age." On the stone of the widow of Capt. Wm. Buswell, who died March 5, 1708, aged 83 years, are these words: "Reader, stand off, and thy due distance keep; For in this bed a friend of Christ doth sleep." Mr. Beaman subsequently called attention to a project started in Amesbury in 1849, to erect a monument to the memory of JOSIAH BARTLETT, a native of the town, who signed the Declaration of American Independence, immediately under the name of John Hancock. Some of the money has been subscribed, but more is wanted to enable

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them to commence the undertaking. Two men have offered $25 each, if eighteen more will subscribe the like sum.

Mr. BEAMAN presented the following resolutions:

Resolved, That the thanks of the Institute be presented to the Agricultural and Horticultural Society of Amesbury and Salisbury, and the citizens generally of those towns, for their very hospitable reception and kind attentions in providing for the tables and furnishing from sixty to seventy carriages to enable the company to ride over the territory, and see the scenery and examine into objects of historical importance. We would mention a few persons, whose names have come to us as having been especially attentive, namely—Hon. John G. Whittier, Hon. Thomas J. Clark, George Turner Esq., Frederick Bagley Esq., Mr. Enoch Huntington, Mr. Enoch Currier, Deacon A. E. Goodwin, Hon. Patten Sargent, J. B. Sargent Esq., Hon. Streeter Evans, Moses True Jr. Esq., Mr. William Proudman, Major Moses Eaton, William C. Binney Esq., Dr. Josiah B. Gale, Mr. David L. Dearborn, Mr. Philip Jones, Mr. Seth Clark, Mr. Joseph N. Clark. To these persons and all others who have shown us favors, we are under great obligations, and beg them to accept our gratitude and good wishes.

Resolved, That the thanks of the Institute be presented to the proprietors of the First Congregational Church for the use of their very handsome and spacious house for our public exercises.

Rev. E. B. WILLSON of Salem, seconded the resolution and spoke of the great enjoyment he had derived from his ride about this beautiful old town. His remarks were in an humorous vein and were pleasantly received.

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The resolutions were unanimously adopted—and the meeting adjourned to Powow Hill, one of the highest elevations in the County, affording magnificent views of the ocean and of the surrounding country far and near.

J. J. H. GREGORY of Marblehead has furnished the sketch of the Topography, &c. of Powow Hill:

To one interested in the study of Geology, Powow Hill is a very interesting deposit. I risk but little in saying that it is one of the largest masses of drift in New England; in other words, it is one of the highest hills of its kind in New England. There are higher hills, and we may grade upward until we pass the invisible point which divides hills from mountains, and onward to our highest mountains, but I much doubt whether we shall find many masses of mere loose material piled so high as Powow Hill. Most hills of great height, and all mountains, whether isolated or in chains, as far as my reading and observations have extended, owe their height to the solid rock which makes them, or forms their nucleus. The rocky mass may not be readily apparent, the action of the elements through untold cycles having gradually broken down every projection, and the broken fragments having been still farther broken and decomposed, a soil has been made, the lowest forms of vegetable life have spread over the surface, supplying, by their decay, food for the higher forms, until, with the lapse of ages, the once bare rugged ledge has its angles smoothed, and its nakedness clothed with the trees and shrubs of the forest. Yet the rocky nucleus will generally outcrop at its apex, gravity having carried all fragments torn from its hoary head downward. By this process of "degradation," as it is termed, mountains and hills are gradually reduced in height; of the two classes, the drift hills, or in other words, the hills made

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up of loose gravel, must have suffered most in their early years, when unprotected at their tops by soil and herbage. It is very safe, therefore, to say that Powow Hill was once considerably higher than at present,—how much higher it would require a nicer observation and more accurate mathematics than Geology is yet conversant with, to determine.

The origin of Powow Hill was, in brief, thus:—From thousands of observations in numberless localities, Geologists have arrived at the conclusion that thousands of years ago a great flood swept down from the North-west, (not Noah's flood,) covering the earth to the depth of a mile or more, and, tearing masses of rocks from hills and mountains, broke up, ground up, and deposited them in masses and beds over the surface of the earth. This was the origin of Powow Hill and others of its class.

Why is the soil of this hill so fertile, and so retentive of moisture to its very top? Doubtless this question has been often asked by the visitor, who, climbing with the expectation of finding but aridity and sterility, has been surprised, at every step of his advance, to find one of the most fertile and well watered (and, I may add, best tilled,) tract of land in the township. A moment's examination of those heaps of stones that industrious hands have collected from the tillage land will explain all. It will be seen that these heaps are made up, to a great degree, of a variety of clay slate, which appears to be readily acted on by the elements. The decomposition of this rock has given a soil abounding in clay, an element which is retentive of moisture. But not only does this rock give an element to the soil retentive of moisture, but it affords a liberal supply of potash and alumina, and thus makes it fertile.

These piles of stone, with the addition of some sand and gravel sprinkled in, would serve as very good models of Powow Hill as it must have appeared when first formed.

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FLOWERS, FLOWERING SHRUBS AND VINES—IN AMESBURY AND SALISBURY.

BY JOHN G. WHITTIER.

Mayflower—Tuxbury's Woods, Salisbury, and several other places.
Dogtooth Violet—on the Powow River.
Arethusa—Northwestern side of Great Swamp and in Salisbury woods.
Cornus Florida—Bugsmuth Hill, just over the Amesbury line in South Hampton, N.H.
Rhodora—Salisbury Woods, Plains, and very abundantly at Pleasant Valley on the Merrimack in Amesbury.
Flowering Raspberry—Whitehall, Amesbury.
Orchis, white and purple—Great Swamp, Amesbury.
Wild Lily of the Valley—Woods near the village.
Wild Tiger Lily and small, light and very graceful *Yellow Lily*—On the Merrimack above Pleasant Valley.
Hare-bells—On the Merrimack banks, Amesbury and Salisbury.
Ground Nut—East Salisbury near depot.
Indian Pipe—Great Swamp.
Cardinal Flower—By the Powow River.
Pond Lily—Kimball's Pond.
Fringed Gentian, Closed Gentian—Salisbury (Old Orchard) and other places, and on Merrimack River, Amesbury.
Witch Hazel—Foot of Powow Hill, and in Woods near the Village.

WILD FRUITS.

Cranberries—at Pond, and East Salisbury.
Blueberries—very abundant in both towns.
Huckleberries—abundant.
Plums—Beach and Sand-bluffs at Salisbury.
Ground Nuts—East Salisbury.
Gooseberries, Strawberries, Raspberries, Blackberries—common in both towns but not very abundant.
Grapes—Several varieties—some of fair quality—none very good.

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PLANTS COLLECTED AT SALISBURY AND AMESBURY, JUNE 25, 1863, BY S. A. D. SHEPPARD AND GEORGE F. H. MARKOE.

Leucanthemum vulgare,
Oldenlandia cœrulea,
Trifolium pratense,
" repens,
Potentilla canadensis,
Ranunculus acris,
Iris versicolor,
Achillea millefolium,
Nuphar advena,
Euphorbia cyparissias,
Trientalis americana,
Pyrola rotundifolia.
Moneses uniflora,
Sisymbrium bermudiana,
Oxalis stricta,
Kalmia angustifolia,
Arum triphyllum,
Sparganium eurycarpum,
Linaria canadensis,
Helianthemum canadense,
Cypripedium acaule,
Rosa micrantha,
" carolina,
Prunella vulgaris,
Leontodon autumnale,
Cerastium vulgatum,
Geranium maculatum,
Viola cucullata,
Gaylussacia resinosa,
Polytrichum piliferum,
Malva rotundifolia,
Capsella bursa-pastoris,
Hudsonia tomentosa,
Viburnum dentatum,
Raphanus, raphanistrum,
Sambucus canadensis,
Taraxacum dens-leonis.

Friday, August 7, 1863.

THE FIELD MEETING AT ROCKPORT, this day was attended by more than three hundred persons. The weather was delightful, and a better selection of a day could not have been made to secure comfort and pleasure in exploring the various interesting localities, which are so abundant in this region. The granite quarries, breakwaters, beaches, Pigeon Cove, the points affording splendid sea-views, and other objects of investigation were duly visited, also the large and valuable Mineralogical collection of Rev. Stillman Barden, comprising not only rich local specimens but rare articles from abroad, disclosed its many treasures for the delight and instruction of the curious.

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The afternoon meeting was held in the Universalist Church, of which Rev. Mr. Barden is the pastor, and called to order at 2 o'clock, by A. C. GOODELL, Esq.

The records of the preceding meeting were read, and the donations were announced as follows:

To the Library—George Perkins; Canadian Institute at Toronto; Redwood Library and Athenæum; C. B. Richardson, New York; Mrs. A. G. Browne; American Academy of Arts and Science; American Geographical and Statistical Society; Philadelphia Academy of Natural Science; Boston Society of Natural History; Editor's British American Magazine; C. T. Jackson, Boston, Mass.; Richard Wheatland; H. S. Cox, of Lynn; E. M. Stone, of Providence; E. P. Robinson, of Saugus; Mrs. Mary E. Wheatland; Horace S. Traill; Robert S. Rantoul; H. M. Brooks; L. A. H. Latour, of Montreal, C.E.

To the Cabinets—John Robinson; Charles F. Nichols; S. S. Simonds; Job Burchstead; James Bartlett; John Orne; S. Q. Felt; Abner C. Goodell Jr.; H. M. Brooks; John C. Osgood; Eben Blatchford.

Letters were announced from Trustees of Beverly Public Library; Pennsylvania Historical Society; Trustees of Boston Public Library; Maine Historical Society; Redwood Library and Athenæum; Trustees Newburyport Public Library; Massachusetts Historical Society; S. L. Batchelder; L. P. Smith; G. W. Skinner of Gloucester; Charles W. Swasey; C. M. Tracy of Lynn; William Merritt; W. B. Rogers of Boston; Francis Alger of Boston; A. W. Dodge of Hamilton; L. Agassiz of Cambridge; E. P. Robinson of Saugus; Long Island Historical Society; J. E. Oliver of Lynn; also from the Committee of Arrangements of the Memorial celebration at Fort Popham, inviting the Institute to attend "the public celebration of the 256th anniversary of the founding of the first English Colony on the shores of New Eng-

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land, Aug. 19, 1607,(O. S.) to take place near the site of Fort Popham, and the place of the original Fort George, at the mouth of the Kennebec river, in the ancient Province of Sabina, Aug. 29 1863." This letter was referred to the President and Vice President of the Historical Department, to take such action as they may deem appropriate.

Mr. GOODELL then requested Hon. ALLEN W. DODGE, as Chairman of the Committee on Field Meetings, to take the Chair. Upon so doing, Mr. Dodge remarked that he had not seen much himself to comment upon, but there were those present who had made different branches of natural history specialities, and whom he would introduce to the audience. He could only say generally that if, as was sometimes observed, these things were getting to be old stories, provided only they were good stories they would bear to be repeated. When Mr. Tracy tells us of flowers he could see new beauties in them, and so when the geologists tell us about rocks and the zoologists about animals. It is a wonder that we are not attentive enough to see the beauties and uses of things in nature. Some roam about in the fields and can not tell any more about plants than they can about the sermons which they hear in church. We train some of our faculties—why not the power of observation? We ought to cultivate these faculties, and the object of the Institute is to encourage people to observe common things. Theorizing without facts will not answer—we must get facts and stand on the laws of nature. One of the most rational employments of the mind is the study of nature.

Rev. Mr. BARDEN of Rockport was then introduced, but he simply remarked that he would speak by proxy, and, after exhibiting a splendid specimen of Scapolite and adding a few comments he called upon Dr. Jackson.

Dr. CHARLES T. JACKSON of Boston responded and made

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some very interesting remarks upon mineralogy. He said that the two great abutments of the arch of society are agriculture and mining—all the arts refer back to one of these two. Mineralogy is the first great division, starting at the foundation stone. Every thing not vegetable or animal is mineral. The minerals are either in masses or in crystals. The latter are the flowers. There are six divisions of crystals and each crystal is an individual, governed by a fixed law, as fixed as in birds or other animals. The object of scientific research is to ascertain the laws of nature.—Chemistry is the physiology of mineralogy. Too much of mathematics has been dragged into mineralogy—a display of learning has injured science. Dr. Jackson paid a very complimentary tribute to local geologists. He said that Lyell in his famous work on the geology of Italy, instead of relying upon his own observation trusted to the local geologists. The local geologist, Dr. J. said, finds many things which a stranger could not, and if he should ever again receive an appointment of State geologist, instead of taking as an assistant some politician or person appointed from partisan, family or friendly motives, he should greatly prefer the help of the local geologists—the clergyman, physician, or citizen,—such as are to be found in every place, who had paid especial attention to the geology of their own locality. He said that Dr. Hitchcock, in his excellent work on the geology of Massachusetts, had mentioned but one mineral as found in Rockport, while the researches of the local geologists had discovered many, which he enumerated; among these were smoky quartz, green feldspar, fluorspar, silicate of manganese, small zircons. Many were in beautiful crystals and may be considered the flowers of mineralogy. To the labors of Rev. Mr. Barden, we are largely indebted for making us acquainted with this interesting locality.

Rev. G. W. Skinner, of Gloucester, who had found the study of nature intensely charming as well as instructive, said he

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had paid more attention to geology than to mineralogy. and that the subject of fossils had particularly attracted his notice, having resided for some time in the vicinity of Trenton, N. Y., where the Silurian Fossils abound. He gave a brief account of some of the principal species there found.

Mr. C. M. TRACY of Lynn, being called upon, alluded to the favorable impressions he received while listening to a course of lectures by the first speaker on mineralogy some twenty years since; and to these he attributed no small part of the interest he now felt in the subject of natural history. Pleasantly alluding to the remarks of the two speakers who had preceded, to the effect that the crystals were the flowers of the rocks, and the fossils the flowers of rocks of a more recent formation, he said we have here the living flowers, and the world was not rendered habitable till the rocks were covered with soil, and clothed with beautiful verdure. He then described the flowers which had been gathered, in his pleasant and instructive manner. Among these were the beach pea, a relative of the sweet pea but not of the eatable kind: the woodbine, or better called the american creeper, which comes very near being a grape vine: the catbrier, the plague of our thickets and representing to us the true sarsaparilla: the wild sarsaparilla and the dwarf elder, which do not merit the name, having no affinity with the sarsaparilla, but more with the parsnip and celery: the sweet alder or pepperbush, belonging to the Heath Family but flowering later than most of its fellows: the checkerberry, belonging to the same family and well known for its spiciness, but called by too many names: the seaside golden-rod, one of the showiest and betraying the effect of the saline air by its fleshy leaves; the sea-rocket, affected in the same way and taking so much salt as to taste of it; the hemp, well known for its fiber, and closely akin to the *Cannabis Indica*, or intoxicating Indian hemp: the field clover, familiarly called "pussy clover" from its wooly heads: and the dodder, whose truly

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parasitic habits make it, to us very remarkable, though it is far from useful, one species injuring the flax-fields in Europe.

Mr. WILLIAM R. DEANE, of Brookline made some remarks pertinent to the occasion, in which he praised the custom of ladies joining in scientific and historical excursions like the present, and expressed delight with this pursuit of the knowledge of nature, where

> "Some pensive creep along the shelly shore,
> Unfold the silken texture of a flower:
> With sharpened eyes inspect a hornet's sting,
> And all the wonder of an insect's wing.
> Others trace, with curious search, the hidden cause
> Of nature's changes, and her various laws:
> Untwist her beauteous web, disrobe her charms,
> And hunt her to her elemental forms"

Mr. HORATIO GATES JONES, of Philadelphia, after a few general remarks, alluded to some of the botanists of Pennsylvania, among whom were Dr. William Darlington of West Chester, recently deceased, author of several works on botany, and William Bartram, of Philadelphia, who may be considered one of the pioneers of American botany. He then alluded to some investigations that had lately been made by him in the early history and statistics of paper-making, alluding to the Rittenhouse Paper Mill in Philadelphia, which is presumed to be the first of its kind established in this country. It was built in 1690. He alluded to the fact that the fibre of the poplar, after being converted by chemical means into a pulp, is largely used in the manufacture of paper.

Rev. Dr. J. C. STOCKBRIDGE, of Chelsea, made some pleasant remarks of a general character.

A lobster just in the process of casting off its shell was placed upon the table, and Mr. EBEN BLATCHFORD of Rockport, made some interesting remarks descriptive of this interesting feature in this class of animals.

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On motion of the Secretary the thanks of the Institute were tendered to the Citizens of Rockport for their kind attentions; also to the Proprietors of the Universalist Church for the use of their commodious building to hold this meeting. Adjourned.

Thursday, August 20, 1863.

THE FIELD MEETING, ON SALEM NECK, this day, attracted the largest audience ever assembled on an occasion of this kind, numbering, it is estimated, not far from two thousand people. The forenoon was devoted by the guests from other towns to an examination of the Library and Museum of the Institute and the Library of the Athenæum in Plummer Hall; the rare collection of the East India Marine Society, which was kindly opened by the Association for the gratification of the strangers; the Court Houses, and other objects of curiosity. A small party, interested in antiquarian studies, visited, under the genial guidance of Mr. Vice-President Goodell, various places of historical note, including the former residences of some of our ancient worthies, the remnant of the old First Church, Gallows Hill, and other points memorable for their historical associations or for the relics which they contain.

At noon vehicles were provided for the transportation of the company to Hospital Point, which soon presented a spectacle of extraodinary interest and picturesqueness; at this place the refreshments were provided in pic-nic style; and the meeting was held at 2.30 P.M. in a spacious tent erected for the occasion.

The President ASAHEL HUNTINGTON presided and welcomed the company in the most cordial manner. He gave a summary of the objects of the Institute and of the Field Meetings, and happily styled the association the Grand Inquest of the County—not in relation to crime and misdemeanors, but in re-

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gard to whatever is to be found upon or beneath its surface, or relates to its natural or local history in every department. He invited the people of the County to co-operate in these objects, to become members of the Society, and to contribute to its library and cabinets whatever of interest or value they were willing to spare for the purposes contemplated.

Records of the preceding meeting were read.

Donations were received, since the last meeting, as appears by the report of the Secretary, from the following:

To the Library—Long Island Historical Society; Henry R. Stiles of Brooklyn, N. Y.; J. W. Thornton of Boston; Massachusetts Historical Society; W. P. Upham; Beverly Public Library; Oliver Carlton; Joseph A. Goldthwait; A. Lincoln of Boston.

To the Cabinets—F. H. Lee; H. M. Brooks; S. Q. Felt; B. O. Peirce of Beverly; James H. Emerton; J. A. Smith; Alfred S. Peabody; Capt. Robert Manning.

Letters were read from Trustees of New York State Library; Newburyport Public Library; Henry R. Stiles of Brooklyn N. Y.; Benj. Greenleaf of Bradford; S. H. Scudder of Boston; W. R. Deane of Brookline; H. G. Jones of Philadelphia; Joel Munsell of Albany N.Y.; J. J. Babson of Gloucester; Charles W. Felt.

As especially appropriate to the locality, the President first called upon the Rev. Joseph B. Felt, LL. D., whose Annals of Salem and other historical productions were complimented for their completeness and thoroughness, for some information concerning Salem Neck. Dr. Felt then read a paper containing many valuable memoranda and historical statements respecting the Neck, Winter Island, and the fortifications—the place being prominently connected with the history of Salem from its earliest settlement. This paper is

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printed in the Historical Collections of the Essex Institute. (See vol. v. page 255.)

H. WHEATLAND, the Secretary, next read a list of the minerals found on the Neck by the researches of some of the young mineralogists of the Society. It appears that, a few years ago, a beautiful blue mineral was discovered in a quarry near Fort Lee, which was at first called cancrinite, but when analyzed was found to be sodalite. It was then thought to be exhausted, but subsequent and quite recent investigations have followed the vein in deeper and some very good specimens have been obtained. The sodalite is found in veins of elœolite, which is itself rare in this country, it being known only in Arkansas. It has been found with sodalite and cancrinite at Litchfield, Me., but is believed to be now exhausted. Last fall a large vein of elœolite was discovered near the other but it has not yet been found to contain any sodalite. The following minerals, in small quantities, have been extracted from these veins, viz.: zircons, white iron pyrites, black mica in crystals, hornblende crystals, magnetic oxide of iron, small seams of opal, and perhaps, fluor spar and molybdenite.

Rev. STILLMAN BARDEN of Rockport spoke very eloquently upon his favorite subject, and remarked upon the rarity of some of the minerals named. He urged the importance of having our eyes open and of learning more of the wonders of nature immediately about us. One of his friends, he said, had written a charming book of Science, entitled "A Walk in my Garden." He did not need to go even so far as his garden; on his own doorstep he found deep themes for study and contemplation. He felt grateful to God every day that He has provided so many beautiful things to look upon, investigate and enjoy. He complained that scientific collections were not thrown open with sufficient lib-

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erality to the public. For his part he was always ready to promote the cause of Science by giving the freest access to his collections.

Rev. G. W. SKINNER of Gloucester exhibited a number of beautiful crystals some of them closely resembling diamonds, and explained the wonderful process of the formation of the crystals of oxide of silicon—how granite was decomposed by great and continuous heat—and how the crystallic force in nature was ever active. His remarks were very interesting and attentively listened to, and the audience were thankful with him that we could now investigate these mysteries of nature without being denounced as heretics or hanged for witchcraft.

Brief remarks were made by Messrs. WILLIAM R. DEANE, of Brookline, and WILLIAM B. TRASK, of Dorchester, the latter a descendant of Captain William Trask, one of the early planters of Salem.

Mr. DAVID PULSIFER, the distinguished antiquarian, of Boston, formerly of Salem, made some very earnest remarks, and referred to recent purchases of the original Solemn League and Covenant signed by the Covenanters of Scotland in 1638, and of some rare folio volumes of the Bible, printed in 1469—which had been secured at high prices to be preserved in this country. He spoke with enthusiasm of the labors of the members of the Institute, and of the richness of the old county of Essex in materials of historical interest and value.

At this point the roll of thunder and indications of a heavy shower became so threatening as to cause a speedy adjournment, much to the regret of the audience, as there were many other speakers present who would have delighted and instructed the listeners. In addition to members of the In-

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stitute, who are always ready in their various departments, there were present from abroad Nehemiah Cleaveland, Esq., of New York; Rev. Dr. E. L. Cleaveland of New Haven, Conn.; Hon. J. Hammond Trumbull of Hartford, Secretary of the State of Connecticut; Rev. Mr. Peabody, a returned Missionary; Wm. C. Binney, Esq., of Amesbury; Hon. J. J. Babson of Gloucester; and many others.

Wednesday, September 2, 1863.

MEETING this day, at noon, J. G. WATERS in the Chair.

WILLIAM P. UPHAM stated that the U. S. Government propose to build one or more Forts in Marblehead, and suggested, it was proper that one of them should bear the name of "Glover," a deserving tribute to the memory of Gen. John Glover of Revolutionary fame, and, on his motion, it was

Voted That a Committee be appointed to co-operate with the town authorities and citizens of Marblehead in such a manner as may be deemed appropriate to obtain this, so desirable an object.

Messrs. W. P. Upham and A. C. Goodell Jr. were appointed on said committee. Adjourned.

Thursday, October 22, 1864.

The last Field Meeting the present season was held at Newbury this day, having been postponed from yesterday on account of the weather. The larger portion of the party proceeded directly to Newburyport, and, having the fortune to be under the guidance of a native of the place, Rev. George D. Wildes, Rector of Grace Church, Salem, visited many objects of interest in this locality, so rich in historical associations; after devoting several hours very profitably and very pleasantly to this exploration, the party proceeded to the

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vestry of the Old-Town Church in Newbury, which was built by the Ladies Benevolent Society, where the afternoon meeting was held.

Several alighted from the cars at the Serpentine quarry, collected specimens of minerals, also zoological from woods adjacent and on the road side to the place of rendezvous. The old burial ground in the vicinity of Rev. Dr. Withington's church offered many objects of interest and presented many quaint inscriptions; The venerable Pastor of this parish, who was settled in 1816, joined the company at the vestry and added interest to the meeting by his presence and remarks. Dr. W. in his 75th, year is still hale and vigorous. In 1804 he was among first apprentices to the printing business in the office of the late J. T. Buckingham. He subsequently entered Yale College, and his scholary, honorable, and useful career since is well known.

The meeting was called to order at 3 P. M.,—A. C. Goodell, Jr., one of the Vice Presidents, in the chair. Records of preceding meeting read, &c.

Donations were announced from the following, received since the Field Meeting, Aug. 20, 1863:—

To the Library—Humphrey Devereux; Firelands Historical Society of Norwalk, Ohio; American Academy of Arts and Science; Miss A. M. Hemmenway of Ludlow, Vt.; Montreal Society of Natural History; J. Hammond Trumbull of Hartford, Conn.; Trustees of New York State Library; Iowa Historical Society; Charles T. Brooks of Newport, R. I.; Henry M. Brooks; E. P. Robinson of Saugus; N. J. Lord; Mrs. James Chamberlain; Adams, Sampson & Co., Boston; C. B. Richardson of New York; Editors of British American Magazine; George R. Curwen; Redwood Library and Athenæum; Charles F. Nichols; Henry P. Nichols; R. S. Rantoul; R. Damon of Weymouth, England; Long Island Historical

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Society; William P. Tucker of Portland, Me.; M. A. Stickney; American Geographical and Statistical Society; James Chamberlain; Connecticut Historical Society; William Stone; Mrs. Lydia D. Parker of Boston; Robert C. Mills; Philadelphia Academy of Natural Science; George Perkins; Lynn Free Public Library.

To the Cabinets—From John Robinson; Charles F. Nichols; Henry F. King; R. Deland; Wm. P. Martin; A. F. Clark; James Kimball; James H. Emerton; Arthur Upton; Daniel L. Proctor; Mrs. H. M. Colcord of South Danvers; C. F. Williams; Stephen W. Hall; Charles H. Higbee; Samuel Phillips, Jr., of Boston; F. H. Lee; Nathan Nichols; W. G. Welch; J. B. Haskell; Franklin Grant; Lawrence Phillips; A. S. Peabody; Mrs. G. R. Mason of Lynn; N. A. Frye; Samuel Hultman; Mrs. M. D. Wallis of Beverly; B. Brown; W. B. F. Johnson; Mrs. J. Chamberlain; Mary E. Williams; Samuel Shepard; A. C. Goodell, Jr., Geo. Harrington.

Letters were read from Firelands Historical Society; Corporation of Brown University; Maryland Historical Society; George A. Walton of Lawrence; Amesbury and Salisbury Agricultural Association; L. Agassiz of Cambridge; Iowa State Agricultural Society; Francis H. Wade of Ipswich; Mrs. L. D. Parker of Boston; E. P. Robinson of Saugus; Long Island Historical Society; J. Hammond Trumbull of Hartford Conn.; Regents of the University of New York; H. A. Smith of Cleveland Ohio; Mrs. P. A. Hanaford of Beverly; John Bertram; Edward Ballard of Brunswick Me; Salem Temperance League; O. Howe of Beverly.

The Chair in opening offered some general remarks upon the objects of the Institute and the mode of carrying out the various plans of its organization. He mentioned that the committee having in charge the lectures and evening meetings had arranged, that, on the 2d and 4th Monday evenings

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of each month, a meeting of the Institute will be held at their rooms, Plummer Hall, commencing at 7 o'clock; on the intermediate Monday evening Mr. F. W. Putnam will deliver a lecture, at the same time and place, on some zoological subject, illustrating the same with specimens from the Cabinets. A course of ten Scientific Lectures will also be delivered at the Lyceum Hall, Salem, usually on Thursday evenings, commencing about the middle of November.

Rev. Dr. WITHINGTON of Newbury gave a brief account of the early history of the church of which he is the present pastor and over which he has been settled about fifty years. He alluded very happily to the conservative character of his church during the Whitefield excitement, a century since, the unhappy differences arising therefrom with the sister churches, and the peaceful settlement of all discord at the time of his ordination. Dr. W. casually stated that his parish, when he was settled, was the largest in extent in the county, and contained 2500 people; and as the law then would not allow the other ministers to marry members in his parish, he enjoyed the monopoly of the business, and joined in marriage an average of twenty-five couples a year.

The Rev. GEORGE D. WILDES of Salem, being called upon by the President, occupied nearly an hour in a very interesting resume of the incidents of the morning's ramble, interspersing the same with very graphic historical sketches of the houses, localities and people of the olden times of Newbury and Newburyport. Quite a large number of the members of the Institute had been detained by engagements at Salem, until a late hour, and the valuable remarks of Mr. Wildes enabled them to follow the course of the Institute in the visits of the morning.

Mr. Wildes stated in substance, that no towns in our ancient, and truly old English County, were more fruitful in

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interesting historic association, than Newbury and Newburyport, from the earliest to the latest dates in their history. Many of the inhabitants of these towns, or their descendants, had held very prominent positions among the literary, the commercial, and most distinguished men of the country in all departments of active life. Taking up the several localities visited in order, Mr. W. resumed the remarks which he had made at the various points of interest visited in the morning. Prominent among these were the "Dexter Museum" now occupied by Dr. E. G. Kelly, and illustrating in its restoration, and in the beautiful gardens about it the well known taste of its hospitable proprietor; The "Mall" once the Camp ground of a portion of Arnold's Expedition to Canada; the house of the Misses Tracy where are deposited the beautiful paintings by Copley, of Col. and Mrs. Lee of Marblehead. Copley is said to have remarked of these, when in later life asked which were his best paintings, that those at Newburyport were regarded by him as foremost among his works. Mr. W. then spoke of the "Wolfe Farm" now the Merrimack House; the Tracy Mansion, where Washington, Lafayette, Talleyrand, Louis Phillipe, Chateaubriand and others were at various times guests; "St. Pauls Church" with its old altar piece, and the exquisite memorial Chapel erected by Rev. Dr. Horton; the tomb of Bishop Ban, the first Bishop of Massachusetts; the Ferry Way; the residence and work shop of Jacob Perkins, the famous Inventor and Engraver; the law office of Chief Justice Parsons, where J. Q. Adams, Rufus King and Robert Treat Paine and other eminent men studied; the "Old South Church" with the monument and tomb of Whitfield; the ancient Colonial Jail; the "Old-Town Meeting House"; the Green where another portion of the Canada Expedition encamped; the ancient Grave Yard of Newbury, where the party found many unique epitaphs; several old houses of historical interest; among others, the Garrison House now the Pettingell Farm

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and many other objects of great interest among the antiquities of the County. Our limits forbid a fuller account of the remarks of Mr. Wildes, which were listened to with marked interest and awakened much zeal in the historical reminiscences of the ancient towns of Newbury and Newburyport.

Mr. F. W. PUTNAM mentioned that in company with several members he had visited the serpentine quarry and found some interesting specimens of serpentine, asbestos, &c. During his rambles in the woods adjacent and the road to this place he had collected several specimens of Insects and Mollusca. Instead of alluding to these at this time he would confine his remarks to the habits of the humble bee, which he had observed during his residence, the past summer, on the banks of Lake Champlain; he spoke of the formation and growth of the colony, comparing the same with those of the common honey bee. He also alluded to the habits of the leaf-cutting bees and the manner of constructing their cells from circular pieces cut from the leaves of the common rose bushes. A general resume was then made of the several species of Reptiles and Fishes found in this county, with some remarks upon their habits.

Rev. C. C. BEAMAN of Salem spoke of the old burial place near by, called up some old associations respecting several worthies of the olden time whose remains lie buried there, —and read some of the epitaphs which were inscribed upon the tablets erected to their memories. He concluded by offering the following votes of thanks, which were unanimously adopted.

Resolved, That the thanks of the Institute be presented to Dr. E. G. Kelly, William Ashby, Esq., the Misses Tracy, and Mrs. J. C. Fletcher, friends in Newburyport, for their very polite attentions in affording facilities for satisfying the

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curiosity for things rare and of historical and antiquarian value; also, to Mr. Ashby, for his generous hospitality.

Resolved, That we tender our thanks to the Ladies' Benevolent Society of Newbury, for the generous loan of their hall, and to Dr. Withington and Mr. Edmund Smith, for their polite attentions during the day.

The meeting then adjourned and the company made a pleasant call upon the venerable Joshua Coffin, Esq., to pay their respects to the historian of "Ould Newberry." Mr. Coffin's health has been quite feeble and would not permit him to attend the meeting, but it is now improving and all were glad to take him by the hand before proceeding to the cars for home, which was reached safely after a day of uninterrupted interest and enjoyment.

Monday, *October* 26, 1863.

Meeting this evening, at 7 1-2 P.M. A. C. Goodell Jr. Vice President in the Chair.

Records of preceding meeting read.

Donations were announced from the following:

To the Library—From C. B. Richardson of New York; G. F. Bagley of Amesbury; Francis H. Wade of Ipswich.

To the Cabinets—From James H. Emerton; George Harrington; John Robinson; James M. Caller; H. P. Nichols.

Letters were read from Trustees of Newburyport Public Library; Department of the Interior; Benjamin Peirce of Cambridge.

Mr. F. W. Putnam read the following communication from Mr. James G. Shute of Woburn on the manner of birth in the Opossum, observed by him while in Beaufort N. C.

The date of the birth was March 16th, 1863. During the

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delivery of the young the parent lay on the right side, with the body curved in such a manner as to bring the sexual orifice opposite that of the pouch, the mouth of the pouch was open or drawn down by contraction of the muscles so as to receive the young when delivered. The young were seven in number. The time occupied in delivery was about four hours. The parent remained in the same position about thirty-six hours and refused all sustenance.

Immediately after the transfer of the young to the pouch I removed one, by detaching it from the teat, in order to ascertain if the movement of the fœtus was instinctive. I found that it was at least partly voluntary, as it made an effort to regain its place in the pouch, and the same movement was made by the parent, as at first, to receive it. I did not notice any use of the limbs or lips of the parent during the transfer of the young.

Mr. F. W. Putnam stated the results of his investigations on the growth of fishes noticed during his residence on the borders of Lake Champlain during the past season. Adj.

Monday, November 9, 1863.

Meeting this evening, Vice President Goodell in the Chair.

Records of preceding meeting read.

Donations were announced from the following:

To the Library—From Department of the Interior; Henry Wheatland; Jonathan Perley Jr.; Editors of British American Magazine; John B. Alley, M.C.; Zoologische Gesellchaft, Frankfort a. M.; John L. Sibley of Cambridge; John H. Silsbee; George Blake.

To the Cabinets—From H. F. King; Charles F. Nichols; C. H. Higbee; Henry Wheatland; Frank P. Watson.

Letters were read from the Trustees of Boston Public Library; Smithsonian Institution; George Perkins; Arthur J. Upton; F. W. Putnam; C. T. Jackson of Boston; J. W. Proctor of South Danvers.

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Henry Wheatland presented in behalf of Charles Davis of Beverly two Record Books of the Essex County Health Insurance Company, established in Beverly in 1847. In connection with this he exhibited several policies of Insurance issued about a century since and gave a brief sketch of the various modes of Insurance practised in this vicinity from that time to the present.

Charles Davis of Beverly being called upon gave a very interesting account of the operations of this Society during the two years of its existence.

This subject was further commented upon by Messrs C. C. Beaman, James Kimball and the Chair.

F. W. Putnam made some remarks on the Iron Mines at Port Henry suggested by specimens presented by Samuel Gray of Portsmouth, N.H.

William P. Upham read a letter from J. W. THORNTON of Boston relative to the naming of the new fort at Gloucester "Fort Conant," referred to the committee appointed in September last on naming of the Fort at Marblehead.

Remarks were offered by several members suggested by the donations presented this evening. Adjourned.

Monday, November 23, 1863.

Meeting this evening Vice President Goodell in the Chair.

Records of preceding meeting read.

Donations were announced from the following:

To the Library—From Iowa State Historical Society; American Geographical and Statistical Society; R. A. Guild Librarian of Brown University; J. D. Hedge Librarian of Providence Athenæum; Estate of John Russell; D. H. Johnson, Jr.

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To the Cabinets—From James Chamberlain; H. S. Wheeler of Newburyport; Miss E. K. Roberts; Mrs. T. Hunt; O. H. Saunders; John Robinson.

Letters were read from Massachusetts Historical Society; Iowa State Historical Society; Robert H. Ives of Providence; H. S. Wheeler of Newburyport.

The Chair introduced HENRY L. ORDWAY of Ipswich who exhibited and explained an invention for preserving trees from the ravages of the Canker Worm.—

Mr. Ordway spoke as follows:—

Very little has been said and written concerning the habits of the Canker Worm until quite recently, that is of much benefit to the owners of fruit trees.

Professor Peck's Natural History of the Canker Worm and Dr. Harris' book on Insects have been so universally circulated, that a general description of the insect will not be necessary.

The female, or grub,* commences to ascend the trunks of trees early in autumn, but not before the ground has been slightly frozen. Some seasons I have seen them appear upon the trees as early as the first week in October; while this last autumn they did not appear until the second week in November. Thus it would seem the action of the frost has something to do with the time of their appearance. It has often been remarked that the eggs which are deposited in autumn do not come to maturity, inasmuch as they are destroyed by the severe cold of winter, and that it is needless to prevent the grubs from laying their eggs upon the trees. This is doubtless a mistake, and is one reason why the numerous expedients that have been adopted, to check the ravages of the worm have not proved more successful. For several years past a large majority of the grubs have deposited their eggs in the fall. They have changed their habits in this respect as formerly the grubs were seen in larger numbers in the spring than in autumn. If then a majority of the eggs are deposited in autumn it is

*The term *grub* is here used to designate the adult female and not the larva.

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reasonable to presume that the insect may at no distant day exterminate itself, provided we admit the truth of the above statement. I can think of only one reason why the eggs deposited in autumn are not as liable to hatch as those deposited in spring, viz: The males, or millers, are seldom seen in autumn, while in spring the males are more abundant than the females. Hence it is a reasonable conclusion that the eggs deposited in autumn are not all impregnated. The grubs are very tenacious of life. No amount of cold or wet seems to affect them in the least degree. Subject them to the coldest weather; freeze them solid as ice and it will not prevent them from laying their eggs, after placing them in a warm room.

A great many people believe that the Canker Worm will descend from the trees on the 17th of June, this idea is not correct, the time of their leaving the trees is governed by the time of their hatching from the eggs. If the season is backward, and the trees do not put forth their foliage, as a matter of course the young worms will not make their appearance. The same degree of heat that causes the buds to expand will cause the eggs to hatch. After which it will require a certain number of days for them to arrive at maturity. They will then leave the trees and not before unless obliged to do so for want of food. In the summer of 1861 I commenced to catch the larvæ for experimental purposes on the 17th of June and found them quite numerous until the 26th, some of these worms were placed in a glass tube filled with earth and others in a barrel in which sods were placed. In both instances the experiments were conducted in the open air, and were quite successful. The worms in the tube burrowed in the earth to a depth of about four inches, while those in the barrel formed their chrysalides among the roots of the sods not going quite so deep as those in the tube. The worms in the tube did not immediately change into the chrysalis state but remained in the larva state at least six days. On the fourth day after the worms had disappeared from the sides of the tube I opened some of the chrysalides and found the larva snugly packed away without change, except that it was reduced in length about one half, and on being disturbed it commenced spanning off in the usual style.

The question is sometimes asked how do the Canker Worms move from one place to another? How is it that

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some orchards are eaten so badly year after year and others not far distant are not eaten at all? These questions can not be answered satisfactorily perhaps, but it would not be amiss to conjecture or guess how they travel, or by what means the change is brought about. The grub governed by her instincts ascends the first upright object that comes in her way and deposits her eggs indiscriminately, going no farther than is necessary to effect her purpose. Clusters of eggs are frequently seen upon fences, posts, houses, &c. The young insects generally are supposed to die when hatched in places where they cannot find food, but this summer I put some eggs into a small bottle, where they hatched and were allowed to remain four or five days without food. On letting them out of the bottle they were as lively and vigorous as when hatched upon a tree. I believe the young worms hatched upon the trunk of a tree are able to sustain themselves until they reach the foliage, even if they are obliged to travel to the extreme top of the tree. The worm, I think, is to a certain extent migratory in its habits, not that they travel in swarms as some species of caterpillars do, but that they are sometimes forced to leave the trees upon which they were hatched for want of subsistence and go to others not eaten, where after remaining a short time, they mature, spin down a second time, and go into the ground, where they remain until autumn, when the grubs ascend the trees upon which the worms were matured. Hence it is plain that the worm causes the change in locality and not the grub as many suppose. The worms are often times blown by high winds considerable distances toward other orchards, when they travel the remainder of the rout thus making a change in that way.

One other means by which this insect is sometimes changed from one place to another is by transplanting fruit trees from nurseries that are infected by these pests. Valuable orchards have been almost destroyed in this manner.

As the female insect is so very prolific all means should be employed for their extermination. Plough the orchard soon after the larvæ form their chrysalides, and allow the swine and poultry to run at large among fruit trees.

We have another exterminator in the common garden toad. It is surprizing to see what quantities of worms they will despatch at a single meal.

There is one other subject to which I wish to call your at-

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tention before closing these remarks, and that is in relation to the male insect. As it is of no consequence about keeping the male from ascending the trees; those who have written upon the habits of the Canker Worm have neglected to say anything regarding him. I should like to have some one who understands this matter explain the manner in which they get out of the ground, and how they appear when first seen.

F. W. Putnam said that there were at least three species of insects known as Canker Worms. Two of these belong to the genus of the true Canker Worm *Anisopterix* and are very much alike in habits and in their general appearance. The third species is larger and the larva is of a yellow color. There are several enemies to these pests; of these the large handsome ground beetle, the mason wasp and the ichneumon fly called *Platygaster*, which lays its eggs in those of the Canker Worm, and as the young Platygaster feeds upon the Canker Worm's eggs their developement is secured at the expense of the latter.

Remarks were then made by Messrs. C. C. Beaman, Ordway, J. M. Ives, and Putnam on the geographical distribution, of the Canker Worm and its disappearance in certain seasons, &c. The opinion prevailed that this State is nearly its northern limit.

On motion of Mr. Beaman,

Voted That the thanks of the Institute be given to Mr. Ordway for his useful, and instructive remarks on the subject of Canker Worms.

On motion of Mr. James Kimball,

Voted, That the officers of the Army and Navy stationed in this city and vicinity, or at home on furlough, be invited to visit the Institute at such times as may be convenient.

Adjourned.

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Monday, December 14, 1863.

Meeting this evening, the President in the chair.

Records of preceding meeting read; and donations were announced from the following:

To the Library—from Jonathan Tucker; Miss E. S. Hotchkiss of New Haven, Conn.; N. J. Lord; Society of Arts, Manufactures &c., London; John B. Alley M.C.; Redwood Library and Athenæum; J. L. Jenkins.

To the Cabinets—from C. F. Nichols; D. M. Balch; Edward H. Knight; James H. Emerton; Charles H. Higbee; H. P. Nichols; J. C. Stimpson; Miss Quiner of Beverly; Theodore F. Brown; Frank P. Watson; Daniel P. Fitz; A. R. Russell; John M. Ives; George Abbot.

A letter was read from JOSEPH A. TORREY of Providence, in relation to printing. In this connection Mr. Goodell presented some remarks upon the combination types and other improvements in type-setting as suggested by C. W. Felt of Salem, with some allusion to Mr. F.'s type-setting and justifying machine, now nearly finished, and in a condition to test the merits of the invention, to a great extent.

A letter was read from JOHN A. MC'ALLISTER of Philadelphia, accompanying an impression from an old plate in his possession, "a Caricature of the Congressional Pugilists in 1798." A brief account of the scene to which this referred was read from the Congressional Journal of that date, and a brief sketch of Roger Griswold M.C. from Connecticut, and Matthew Lyon M.C. from Vermont, the persons represented therein, was given by the Secretary.

Letters were also read from Chicago Historical Society; Directors of Providence Athenæum; Pennsylvania Historical Society; Trustees of New York State Library; R. S.

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Rantoul; Chas. W. Tuttle of Boston; N. E. Atwood of Provincetown; Daniel H. Johnson, Jr.; Iowa Historical Society; Jacob Batchelder of Lynn; Editors of the Round Table.

W. P. UPHAM from a Committee appointed at a previous meeting, submitted the following statement:—

In making the recent alterations at Fort Pickering, about half of a dozen twelve pound shot were taken from the north-east and south-west corners of the old parapet facing the harbor. They were found buried about three feet beneath the turf half way from the top of the parapet. There is good reason to believe that these balls were thrown there by the British Man of War Nautilus, when she chased the Privateer Rattlesnake into Beverly harbor, Oct. 10, 1775. An account of this affair is given in an old newspaper, the "New England Chronicle or Essex Gazette," of Oct. 12, 1775, also in Stone's History of Beverly, page 64.

The Privateer was chased in from the Bay and ran ashore in Mackerel Cove near Beverly. The Man of War got aground on Nathaniel's Ledge, south-east of Woodbury's point and in this position bombarded the town of Beverly till the tide leaving her, she careened so that she was unable to bring a single gun to bear. Thus she remained under constant fire from the Salem people on Hospital point and from Sharpshooters on the Beverly shore till dark, when she cut her cable and got off, having been considerably damaged. It is probable that as the Nautilus entered the harbor, she passed not far from Fort Pickering and fired a broadside at it.

The Fort has been repaired twice since then, once in 1798 and again in 1809.—but from the accounts lately given of these repairs and from the appearance of the place previous to the present alterations, it is inferred that a part of the old parapet where these balls were found has not been materially altered since the Revolution.

GEORGE D. WILDES followed with some remarks relating to the Forts and to the sailors and soldiers of the Revolution and of the War of 1812 furnished by Salem, Newburyport and other towns of the County. He made particular men-

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tion of Capt. William Nichols of Newburyport, a noted privateersman in the war of 1812, and related some of his feats of bravery and skill, of his being a prisoner, his escape and his recapture. He then alluded to the *Collins House* in Danvers, (now the residence of F. Peabody, Jr. Esq.) as a place of historic interest, being the head-quarters of Gov. Gage, and also the encampment near by of a regiment of British troops, on the eve of the outbreak of the Revolution.

A. C. GOODELL in reply to some questions, spoke of the Forts in Salem and vicinity, the old Town House and other incidents of the period immediately preceding the revolution. He then offered the following resolution in behalf of a committee appointed at a previous meeting which was unanimously adopted.

Resolved, That the Essex Institute earnestly unites in the petition of any persons or corporation to the Secretary of War to give to the fortifications erecting or to be erected in Marblehead in this county, the name of Fort Glover, in memory of Gen. John Glover and to the works designed for the "Stage" in Gloucester in this county, the name of Fort Conant, in honor of Roger Conant the founder of the first plantation in Massachusetts Bay.

On motion of James Kimball,

Voted, That the Rev. G. D. Wildes be requested to prepare a memorial of Capt. Wm. Nichols of Newburyport to be read at a meeting of the Institute and for publication in the Historical Collections. Adjourned.

Monday, December 28, 1863.

Meeting this evening, A. C. Goodell Jr., in the chair.

Records of preceding meeting read, and Donations were announced from the following:

To the Library—from George R. Curwen; J. H. Hickcox of Albany N.Y.; C. B. Richardson of New York; Ca-

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nadian Institute; Montreal Society of Natural History; Editors of Round Table, New York; S. H. Scudder of Boston; R. H. Wheatland.

To the Cabinets—from Joseph A. Goldthwaite; C. H. Higbee; E. Q. Putnam.

Letters were read from Pennsylvania Historical Society; Long Island Historical Society; J. A. Goldthwaite; N. E. Atwood of Provincetown; W. B. Rogers of Boston.

F. W. Putnam announced the decease of the Cabinet Keeper, R. H. Wheatland, with appropriate remarks. Messrs. J. A. Gillis and F. W. Putnam were requested to prepare a biographical notice to be presented at the annual meeting.

W. P. UPHAM announced the decease of the following members of recent occurrence—Charles M. Endicott, Gilbert G. Newhall, Thomas Trask, John B. Peabody. Messrs. G. D. Phippen and the Secretary were requested to prepare obituary notices for the annual meeting.

Rev. GEORGE D. WILDES read a letter from B. Hale of Newburyport, respecting the materials for a memoir of Capt. William Nichols of Newburyport, recently deceased.

F. W. PUTNAM offered some remarks upon the habits of the Grisly Bear—suggested by a skull, a recent contribution to the Cabinets from the late Capt. Wm. O. Potter.

GEORGE A. WARD stated that measures were in progress to obtain possession of the frame of the old building on the land of David Nichols in the rear of Boston Street, and to place the same in rear of Plummer Hall.

George A. Ward was placed on the Committee of enquiry as to the authenticity of the tradition that the frame of the above mentioned building is that of the first meeting-house in Salem, in place of Charles M. Endicott, deceased. Adj.

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PROCEEDINGS

OF THE

ESSEX INSTITUTE.

VOL. IV.

1864–5.

[Issued Quarterly.]

SALEM:

PUBLISHED BY THE INSTITUTE.

1866.

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PROCEEDINGS

OF THE

ESSEX INSTITUTE:

1864.

MONDAY, JANUARY 11. Evening meeting.

The President, A. Huntington, in the chair.

Donations to the Library and Cabinets were announced.

Rev. G. W. Briggs occupied the evening in reading a portion of a Memoir of the late President of the Institute, Hon. D. A. White.

Adjourned to Thursday evening next, for the continuation of the reading of the Memoir.

WEDNESDAY, JANUARY 13. Ordinary meeting.

J. G. Waters, in the chair.

E. K. Roberts was appointed Secretary pro tempore.

Arthur Kemble, and William Neilson of Salem, were elected Resident Members; Benjamin Peirce of Cambridge, James B. Endicott now in England, and William Endicott now in China, Corresponding Members.

THURSDAY, JANUARY 14. Adjourned evening meeting.

The President in the chair.

H. M. Brooks was elected Secretary pro tempore.

Rev. Dr. Briggs finished the reading of his Memoir of the late Judge White.

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The thanks of the Institute were voted to Rev. Dr. Briggs, for his valuable and interesting Memoir of our late President, and a copy was requested for publication. (See Historical Collections, VI, No. I.)

MONDAY, JANUARY 25. Evening meeting.

The President in the chair.

Donations were announced to the Library and Cabinets.

Letters were read, from G. A. Ward accepting membership; from Corporation of Yale College; Trustees of the Newburyport Public Library; and New Haven Colony Historical Society, acknowledging the receipt of Publications: from R. S. Rantoul, in relation to the naming of Forts in Marblehead and Gloucester.

George A. Ward read a communication, giving an account of the formation of the ESSEX HISTORICAL SOCIETY, forty-two years ago last June.

Allusions having been made in Mr. Ward's communication, to the existence of the frame of the original "First Church," in Salem, on the land of David Nichols, rear of Boston street, considerable discussion ensued, as to the proof of the above mentioned frame being that of the "First Church." The President, Francis Peabody, G. A. Ward, A. C. Goodell Jr., and Rev. G. D. Wildes participated in the discussion; the arguments adduced seemed to favor the affimative of the question.

The thanks of the Institute were voted to Mr. Ward, for his valuable communication and a copy was requested for publication. (See Historical Collections, VI, No I.)

MONDAY, FEBRUARY 8. Evening meeting.

The President in the chair.

Donations to the Library and Cabinets were announced.

Letters were read, from Wm. Neilson accepting membership:

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from the Smithsonian Institution, Washington, acknowledging the receipt of Publications: from Jonathan Pearson of Schenectady, in relation to the publications.

The Secretary read a communication from D. M. Balch, "*On the Sodalite at Salem.*" Referred to the committee on publications.

F. W. Putnam read a communication from George H. Emerson of Cambridge, "*On Magnetite, and an Unknown Mineral at Nahant.*" Referred to the publication committee.

Rev. G. D. Wildes spoke of the thoroughly English aspects of several of our olden towns in the County of Essex, noting particularly those of Ipswich, as illustrating to the untravelled eye, the marked features of the English rural town. Probably no County in the State in its local names and physical character is more suggestive of associations connected with the mother land.

A. C. Goodell Jr., in presenting to the meeting, one of the parts, (viz: the deed to the grantees, Edward Winslow and Robert Cushman,) of the original indenture or patent from Lord Sheffield, of the territory of Cape Ann, which indenture was deposited in the archieves of the Institute by J. Wingate Thornton Esq., of Boston, gave a brief account of the dates of the several voyages of discovery, charters and settlements by Englishmen in America; and specially referred to the earlier grants and charters of the planters at New Plymouth and Massachusetts Bay.

The instrument deposited by Mr. Thornton, bearing date Jan. 1, 1623–4, he declared to be the grant under which the New Plymouth people first laid claim to Cape Ann, and began that series of settlements by fishermen and planters which laid the foundation of this flourishing Commonwealth.

Mr. Wildes followed Mr. Goodell in some remarks as to the great value of such documents, and alluded to the care taken of similar articles in the British Museum, mentioning several very valuable historical relics which he had seen in that collection.

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The thanks of the Institute were voted to Mr. Thornton for this valuable contribution.

WEDNESDAY, FEBRUARY 10. Ordinary meeting.
H. J. Cross in the chair.

Charles Creesey and Joshua Safford, of Salem, were elected Resident Members.

MONDAY, FEBRUARY 22. Evening meeting.
Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library and Cabinets were announced. F. W. Putnam presented a communication by A. S. Packard Jr., of Brunswick, Maine, entitled "*Notes on the Family Zygænidæ.*" Referred to the Committee on Publications.

R. S. Rantoul read the following communications which he had recently received from the War Department, at Washington, accompanying the same with a brief account of his visit to Washington and his interview with Mr. Whiting, the Solicitor for the Department, in relation to the subject of naming the Forts in Gloucester and Marblehead:—

WAR DEPARTMENT,
Washington City, Feb. 8th, 1864.

ROBERT S. RANTOUL Esq.,

DEAR SIR,

I have the pleasure of enclosing the order of the Secretary of War made at my request in accordance with the wishes of the Essex Institute, naming Fort Glover and Fort Conant.

Respectfully, your obedient servant,

WILLIAM WHITING,
Solicitor of the War Department.

WAR DEPARTMENT,
Washington City, Feb. 7th, 1864.

SIR,

The Secretary of War directs me to acknowledge the

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receipt of Mr. Robert S. Rantoul's communication dated January 22d, addressed to you and enclosing copy of a resolution passed by the "Essex Institute" of Salem, Massachusetts, recommending that the fortifications now erecting in Marblehead be named "Fort Glover," and the works designated for the "Stage" in Gloucester "Fort Conant."

In reply, I am instructed to inform you, that the Secretary regards the names proposed as suitable designations of these defences, and that he has ordered that they be named accordingly.

Very respectfully, your obedient servant,

ED. M. CAMBY,
Brigadier General, A. A. G.

Hon. WM. WHITING,
Solicitor of the War Department.

The chair remarked as follows: soon after the publication of Mr. W. P. Upham's Memoir of Gen. John Glover of Marblehead, S. H. Phillips Esq., suggested the propriety of having one of the Forts about to be constructed in Marblehead named "Fort Glover."

At a meeting of the Essex Institute, held on Wednesday, Sept. 2, 1863, on motion of Mr. W. P. Upham, a committee, consisting of Messrs. W. P. Upham and A. C. Goodell Jr., was appointed to coöperate with the town authorities and citizens of Marblehead in such a manner as may be deemed appropriate to accomplish this object.

At a meeting held on Monday evening, Dec. 14, 1863, the subject of naming the fortifications designed for the "Stage" in Gloucester, "Fort Conant," suggested in a letter to Mr. Goodell by J. Wingate Thornton Esq., of Boston, in honor of Roger Conant, the founder of the first plantation in Massachusetts Bay, was brought to the notice of the Institute and referred to the same Committee who had under consideration the naming of the Fort at Marblehead.

Mr. Goodell moreover stated that as the business for which the Committee was appointed had been so fully accomplished by Mr. Rantoul, he desired to be excused from further duty.

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This was voted, and also a resolution of thanks to Mr. Rantoul.

Adjourned to meet on Monday of next week, Feb. 29th, and voted that meetings be held on every Monday until otherwise ordered.

WEDNESDAY, FEBRUARY 24. Ordinary meeting.
H. F. King in the chair.

Henry R. Stone of Salem, was elected a Resident Member.

Charles E. Hamlin of Waterville, Me., and S. I. Smith of Norway, Me., were elected Corresponding Members.

MONDAY, FEBRUARY 29. Evening meeting.
Vice President, A. C. Goodell Jr., in the chair.

Donations were announced to the Library and Cabinets.

Letters were read, from Henry R. Stone, accepting membership: from B. F. Mudge, of Quindaro, Wyandote Co., Kansas, in relation to the Geological survey of that State: from Trustees of the New York State Library; Historical Society of Pennsylvania; Henry A. Smith of Cleveland, Ohio; J. Henry Stickney of Baltimore, Md.; and N. Paine of Worcester, relating to the publications.

F. W. Putnam made some remarks on Orthopterous Insects, suggested by specimens presented to the Institute by Miss Edmands.

Mr. Putnam presented a communication from A. E. Verrill of Cambridge, entitled "*Synopsis of the Polyps collected during the years* 1853–6, *by Dr. Wm. Stimpson, Naturalist to the North Pacific Expedition, commanded by Captains Ringgold and Rogers.*" Referred to the publication committee.

The Secretary read the following communication from Geo. A. Ward, in regard to the naming of "Fort Lee."

"While at work in reconstructing the fort on Salem Neck in 1812 as a member of the Salem Light Infantry, my grandfather informed me that it was originally planned by General CHARLES LEE, and that he gave instructions regarding it, and that his name was given to it. My said Grandfather was of the Com-

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mittee of Safety and had considerable to do as to the fortifications in the neighborhood of Salem, and I think he could not be mistaken as to Fort Lee."

Extracts from the Town records were read in relation to this subject, and remarks were offered by the chair, H. Wheatland, W. P. Upham and others. Some suggesting that the Fort was named for Colonel W. R. Lee, formerly collector of Salem and an active officer in the Revolution.

The chair presented in behalf of J. V. Browne, a copper plate, on which was engraved the likeness of Rev. Joseph Sewall of Boston, and gave a brief sketch of the life of Mr. Sewall.

T. Ropes made some enquiries relative to the old Friends Meeting House, on the South side of Essex street, between Monroe and Dean streets, which were replied to by the chair.

John M. Ives spoke of the new silk worms that feed on the Ailanthus, and remarks were offered by F. W. Putnam and others on silk producing worms.

The remainder of the evening was occupied by F. W. Putnam, who gave a general view of the geological succession of animals, and their geographical distribution at the present time.

John H. Bettis and Robert Brookhouse 3d, of Salem, were elected Resident Members.

MONDAY, MARCH 7. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library and Cabinets were announced.

Letters were read, from C. E. Hamlin and S. I. Smith, accepting membership: from S. Jillson respecting some Birds.

H. Wheatland read extracts from the Records of the Superior Court of Judicature and the Inferior Court of Common Pleas (1766) relative to one Jenny Slew of Ipswich, Spinster, (colored woman) vs. John Whipple Jr. of Ipswich, claiming damages for his detention of her as a slave. The judgment of the Inferior Court was reversed by the Higher Court and the plaintiff recovered her liberty and damages.

Rev. G. D. Wildes spoke of Domestic Servitude as it existed

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in this country prior to the Revolution, and instanced the case of a Norwegian girl in his Grandfather's family, whose services were purchased for a term of years.

The chair alluded to a similar case in Manchester.

Mr. Wildes spoke of Marblehead as presenting a near and most interesting field of Antiquarian research for the younger members of the Institute, whose minds might be directed to that department. St. Michael's Church, with its ancient Church yard; the old mansions of that formerly flourishing seaport; the history of several families identified with Colonial and Revolutionary history, would be found to present most interesting points of enquiry.

Mr. Wildes also spoke of Christ Church, Cambridge as perhaps the best specimen, in this country, of the English Village Church of the last Century. It was a question whether the frame of this Church was brought from England or not. Mr. W. gave an interesting account of the Vassal family, in connection with this Church, and of the several old mansions, still marking the social life of Cambridge in the Ante-revolutionary history of the town. A visit to Cambridge, in connection with researches into the history of some of these, even now elegant residences of a later generation, would be found to be full of interest and instruction.

Remarks of a conversational character from Messrs. Wildes, Beaman, the chair and others, relating to Boston and its vicinity in Revolutionary times occupied the rest of the evening.

A Committee consisting of Messrs. F. W. Putnam, J. A. Gillis, R. S. Rantoul, W. P. Upham and H. Wheatland were appointed to revise the Constitution and By-Laws.

MONDAY, MARCH 14. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library and Cabinets were announced.

Letters were read from Joseph A. Goldthwait of New Berne, N. C., relating to specimens sent to the Institute: from Wm. A.

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Smith of Worcester, Mrs. P. A. Hanaford of Beverly, S. D. Bell of Manchester, N. H., C. M. Tracy and F. E. Oliver of Lynn, relating to business matters.

The Secretary read some extracts from the Records of two Aqueduct Corporations, which, though limited in their operations, are interesting as relating to the history of the introduction of water into this city. (See Historical Collections, VI, No. I.)

F. W. Putnam exhibited the Pea Hen recently presented by F. Peabody and mounted by S. Jillson. This Hen had been kept on the grounds of Col. Peabody for seventeen years; about two years since she commenced to assume the plumage characteristic of the male, and had so far accomplished this object that at the time of her death she had attained the "train" and the brilliant colors of the male. Mr. Putnam stated that Latham, in his Synopsis of Birds, mentioned two such instances that had come under his observation. He also said that similar cases had been noticed among other birds, and was quite common in the English Pheasant. Similar changes in the external appearance were known to take place in some species of fishes.

A. C. Goodell Jr. read a portion of an account, presented by George B. Loring, of the houses on Essex street in 1793, written by Col. Pickman who died in 1819.

Thomas Morong of Gloucester, was elected a Resident Member, Jeremiah L. Hanaford of Watertown, and Benj. F. Mudge of Quindaro, Kansas, were elected Corresponding Members.

MONDAY, MARCH 21. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library were announced.

Letters were read, from the Trustees of the New York State Library, giving notice of the transmission of books: from Trustees of the Boston Public Library, acknowledging the receipt of publications: from Wm. A. Smith of Worcester, in relation to publications.

Mr. Goodell concluded the reading of Mr. Pickman's account

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of the old houses on Essex street. Referred to the publication committee to be printed in the Historical Collections.

Some discussion followed relative to the old houses in Salem, participated in by Messrs. Ropes, Goodell and others.

MONDAY, MARCH 28. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library and Cabinet were announced.

F. W. Putnam made some remarks upon the Trilobites from the Braintree quarry, presented by A. S. Packard Jr.

The Rev. Mr. Wildes, presented to the Institute, several articles which he had procured in a visit to Newburyport this afternoon. One of these was a framed engraving of the body of Marshal Ney, as it appeared after being taken to a conventieal house in Paris, immediately after his execution. The engraving, suppressed by the Allied Commander in the fear that it might tend to popular tumult, is supposed to be the only one in this country. It presents a most faithful portrait of the Marshal, and is not the least interesting among the historical objects in the collection of the Institute.

Mr. W. also presented to the Institute, on deposit, the bullet by which Capt Greenleaf was wounded in the fight with the Indians near Newbury, in 1695. It is hoped, that the buff coat, worn on the occasion by Capt. G., and still in the possession of his descendants, may eventually be obtained for the Institute.

A third article presented by Mr. W., on behalf of the Misses Tracey of Newburyport, was the snuff box of the eminent merchant Jeremiah Lee of Marblehead, the subject of the exquisite painting by Copley, now, with that of Madame Lee, in the possession of the Misses Tracey.

Another article presented by Mr. W., in behalf of E. W. Rand Esq. of Newburyport, was a pair of very ancient tongs, used for the purpose of lighting a pipe, and with various pecu-

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liar contrivances for securing reasonable comfort in smoking. Mr. W. accompanied the presentation with various interesting details as to these and other objects of interest, which might eventually be procured from the same sources for the collections of the Institute.

F. W. Putnam called the attention of the meeting to a singular monstrosity that had been presented by Mr. James Buffington of Salem. This was a young duck that had, apparently, an extra leg developed from its back. Upon dissection this leg proved to be made up in some parts, of two legs closely united. The portion joining the pelvis (the femur,) being single, but the second segment of the leg (tibia and fibula) was shortened and spread out, so as to allow the articulation of *two* tarso-metatarsal bones, and from this point the foot was nearly double, having six toes, the two small hind toes being wanting.

Mr. William Mansfield presented to the Institute a wooden model, used before the city government to illustrate the grade and direction of the proposed route of the Eastern Railroad, in 1837-8, through Washington Street, in Salem. This model contains, in miniature, all the buildings then standing on the land included in the present Washington Street South of Essex Street, except the "Marston building." The chair gave an historical sketch of these several buildings, and of earlier structures in the same locality.

Additions to the Museum and Library during January, February and March, 1864.

TO THE NATURAL HISTORY DEPARTMENT.

BERTRAM, JOHN. Specimen of Malachite.

BUFFINGTON, JAMES. Malformed Young Duck.

EDMANDS, MISS A. M. Collection of 24 species of North American Orthoptera, named by Mr. Scudder. 250 specimens of New England Spiders.

FELT, S. Q. Lime incrustation from Brazil.

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GOLDTHWAIT, CAPT. J. A., New Berne, N.C. Fossil wood, a portion of a large tree, from Neuse River, near Kingston, N. C.

HAMLIN, PROF. C. E., Waterville, Me. 3 Salamanders, 2 species from Waterville.

HARRINGTON, CAPT. GEO. Fossil Shells from Gibraltar.

HARTT, C. F., St. John, N. B. Fossil coral, *Siderastrea siderea* Blainv. from Bermuda. 7 species of Minerals from Nova Scotia.

HARTT, J. W., St. John, N. B. Two specimens of Fossil Fish from the Albert Coal Mine, N. B.

KING, CAPT. H. F. Wood of the *Sophora Japonica.*

LYCEUM OF NATURAL HISTORY OF WILLIAMS COLLEGE (In exchange.) 19 species of Corals from Florida, named by Mr. Verrill.

MUSEUM OF COMP. ZOÖLOGY, Cambridge. (In exchange.) 32 species of corals from various localities. Named by Mr. Verrill. 16 specimens, 11 species of Bird's eggs from Florida, Grand Menan and Anticosti.

NEAL, JOS. Body of a Fox, for Skeleton.

ORDWAY, H. L., Ipswich. 34 specimens, 5 species of Spiders from Ipswich.

PACKARD JR., A. S., Brunswick, Me. Trilobites from the Braintree Quarry. 40 species, 200 specimens of Lepidoptera Maryland. 3 species, 8 specimens of Lepidoptera from England.

PEABODY, FRANCIS. A female Pea fowl which had assumed the characteristic plumage of the male.

PUTNAM, F. W. Iron Ore from Port Henry Mines, N. Y. Clay stones from Lake Champlain.

PUTNAM, CAPT. W. H. A. Copper from Chili. Dry shells and Echini from Caldera, Chili. Alcoholic specimens of Crabs and Starfishes from Caldera.

ROBINSON, JOHN. 40 specimens, 12 species of Insects from Salem.

RUSSELL, T. B. Geological specimen of Sand Stone.

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SANBORN, F. G., Boston. 117 specimens, 28 species of Spiders from Essex County.

SMITH, LAWRENCE P. Insects from the Southern States.

SMITH, S. I., Norway, Me. Young Salamanders from Norway.

STEVENS, C. B. Skin of a Phatagin *Manis tetradactyla* from Madagascar.

STONE, W. H., Agent Port Henry Mines, N. Y. Specimen of the Cheever Iron Ore from four hundred feet depth.

TO THE HISTORICAL DEPARTMENT.

BARTON, WM. C. Model of a Chinese Vessel.

BROOKS, H. M. Rebel Prayer Book, from a Blockade Runner; Child's book of 1812.

BROWN JR., BENJ. Two United States Buttons.

BROWN, HORACE. Feather Cape from India.

COLE, MRS. N. D. Bust of Alex. Hamilton, (in plaster, bronzed.)

CLOUTMAN, WILLIAM R. 3 China, 3 Japanese and 3 Russia Coins. Japanese Inkstand. Brick from Captain Kid's Fort, and a Stone from the grave of "Paul and Virginia."

GREENOUGH, W. An old Musket, taken from a Blockade Runner.

KIMBALL, CAPT. THOMAS. Model of a Catamaran used on the coast of Brazil.

MANSFIELD, WM. Model used to illustrate the route of the Salem Tunnel.

NICHOLS, MRS. ANDREW. Tile from the old Gov. Winslow house, Plymouth.

NICHOLS, C. F. Stone from the Hoosac Tunnel, half a mile from the entrance.

NICHOLS, CAPT. JAMES B., 24th Reg. Mass. Vols. Stone from an old Spanish Fort at St. Augustine, Fla.

ORDWAY, LIEUT. A., 24th Reg. Mass. Vols. Rebel Musket

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taken at the Battle of Roanoke Island. Portion of Rebel Flagstaff at Washington, N. C.

RAND, E. W., Newburyport. Ancient Tongs used for lighting a pipe.

ROBINSON, JOHN. War Relics from New Berne. Chinese Playing Cards.

ROGERS, EWD. S. Old Tiles for Fireplace ornaments.

RUSSELL, A. B. Cane made with a jackknife.

SMITH, LAWRENCE P. Rebel Sword.

WARD, G. A. The Waistcoat worn by Capt. Jonathan Haraden during the Revolutionary war.

WARD, W. R. L., New York. Shaving from a wrought iron cannon, made at Falls Village, Conn.

WIGGIN, J. K., Boston. Sword blade, from the cargo of the Anglo-Rebel Blockade Runner "Minna."

WILDES, REV. G. D. (On deposit.) An engraving of the body of Marshal Ney, from a drawing made soon after his execution. The bullet taken from the body of Capt. Greenleaf, wounded in a fight with the Indians near Newbury in 1695. The Snuff Box of the eminent merchant Jeremiah Lee of Marblehead.

TO THE LIBRARY.

CHASE, GEORGE C. Friend's Review, 20 numbers.

COLE, MRS. N. D. Salem Gazette, 1863, 1 vol. folio; Boston Daily Evening Traveller 1863, 2 vols. folio.

DAVIS, CHARLES of Beverly. Files of Beverly Citizen, vols. 1 and 2, folio, 1850 to 1853.

DECOSTA, B. F. of Charlestown. Footprints of Miles Standish, by Rev. B. F. Decosta, 12mo, pamph. Charlestown, 1864.

DODGE, ALLEN W. of Hamilton. Cushing's Newburyport, 12mo, 1826; Report on Hoosac Tunnel, Feb. 1863, 8vo, pamph.

FOOTE. C. Files of several County Papers, for September, October, November, and December, 1863.

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GILLIS, JAMES A. Massachusetts State Registers for 1856 and 1858, 2 vols. 8vo. 25 Pamphlets.

HANAFORD, MRS. P. A. of Beverly. Several numbers of the New Jerusalem Messenger.

HODSDON, JOHN L of Augusta, Me. Annual Rep. of Adj. Gen. of Maine for 1862, 1 vol. 8vo. Augusta, 1863.

HOLMES, JOHN C. 24th Annual Rep. of Supt. of Public Instruction of Michigan, 8vo. Lansing, 1862.

JOHNSON, A. B. of Utica, N. Y. Our Monetary Condition, by A. B. Johnson, 8vo, pamph. Utica, 1864.

JOHNSON JR., CAPT. DANIEL H. Enrollment List, 5th Dist. Mass., Nov. 1863. 4to.

JOHNSON, MRS. LUCY P. Independent for 1863, fol. New York.

KILBY, W. H. of Eastport, Me. Eighth Annual Rep. Sec'y of Maine Board of Agriculture, 8vo. Augusta 1863.

LANGWORTHY, ISAAC P. of Boston. Spirit of Missions, ten numbers. Am. Tract Soc. of New York Annual Reports 28, 30, 32, 33, 34. Am. Tract Society of Boston. Reports 11, 37, 61, 65, 67.

LORD, N. J. Boston Post, Dec. 1863 and Jan. 1854.

LORING, GEORGE B. Two manuscript volumes containing the Expenses of Salem from 1788 to 1802, kept by Benjamin Pickman.

MASSACHUSETTS SECRETARY OF STATE. Mass. Public Documents 1862, 3 vols. 8vo; Census of Mass., 1 vol. 8vo, 1863; 19th and 20th Registration Reports, 2 vols. 8vo; Acts and Resolves for 1863.

MOORE, GEO. H. of New York. The Treason of Chas. Lee, by G. H. Moore, 1 vol. 8vo. New York, 1860. Historical Notes on the Employment of Negroes in the American army of the Revolution, by George H. Moore, 8vo, pamph. New York, 1862.

NICHOLS, CHARLES F. Collection of Handbills, &c.

NICHOLS, GEORGE. Christian Inquirer for 1863, 1 vol. fol. New York.

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NICHOLS, HENRY P. Several pamphlets.

OLIVER, H. K. 27 pamphlets, including Legislative Documents and Town Reports.

PAINE, NATHANIEL of Worcester. Worcester Directory for 1864. 12mo.

PUTNAM, CAPT. GEORGE D. Regulations of the Army of the Confederate States, 12mo. Richmond, 1863.

RANTOUL, R. S. Several pamphlets.

SHORT, JOSEPH. Shepard's Sound Believer, 12mo. Boston, 1762.

SIBLEY, JOHN L. of Cambridge. 38th Annual Rep. of Pres. and Fellows of Harv. College, 8vo, pamph. Cambridge, 1864.

STEVENS, C. B. Pilot from July to Dec. 1807 and part of 1809, 3 vols. folio. London.

STONE, E. M. of Providence, R. I. Report of the Ministry at Large, Jan. 24, 1862, 8vo, pamph. Providence, 1864.

SWETT, S. of Boston. Original planning, &c. of Bunker Hill Monument, by S. Swett, 8vo, pamph. Albany, 1863.

UPTON, GEORGE. Scientific American, several numbers.

UPTON, JAMES. Magazine of Horticulture, vols. 8 to 29, 22 vols, 8vo, Boston, 1842, &c.; Horticulturist for 1863, 1 vol., 8vo, New York, 1863; Littell's Living Age, vols 77, 78, 79, 3 vols, 8vo, Boston, 1863; Am. Bapt. Missionary Magazine, vol. 43, Boston, 1863; Nautical Magazine, vols. 2 to 6, 5 vols., 8vo, New York, 1855, &c.. Barry's Fruit Garden, 1 vol., 12mo, New York, 1851; Kenrick's Am. Orchardist, 3d edition, 1 vol., 12mo, Boston, 1841; Kenrick's Am. Orchardist, 7th edition, 1 vol., 12mo, Boston, 1844; Johnston's Agricultural Chemistry, 1 vol., 12mo, New York, 1844; Downing's Fruit and Fruit Trees, 1 vol., 12mo, New York, 1845; Field's Pear Culture, 1 vol., 12mo, New York, 1859; Liebig's Agricultural Chemistry, 1 vol, 12mo, Cambridge, 1842; Hoare on Vine Roots, 1 vol., 12mo, London, 1844; Hoare on Grape Vines, 1 vol., 12mo, Boston, 1840; Manning's Book of Fruits, 1 vol., 12mo, Salem, 1838; Jaques on Fruit Trees, 1 vol., 12mo,

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Worcester, 1849; Thomas' Fruit Culturist, 1 vol., 12mo, Auburn, 1849; Lindley's Horticulture, 1 vol., 12mo, New York, 1841; Elliott's Fruit Grower's Guide, 1 vol., 12mo, New York, 1854; Peter Schlemihl in America, 1 vol., 12mo, Philadelphia, 1838; Wood's Modern Pilgrims, 2 vols, 12mo, Boston, 1855; Lester's Glory and Shame of England, 2 vols., 12mo, New York, 1841; Pamphlets, 23.

WARD JR., CHARLES. New York Journal of Commerce from July to Dec., 1863; Philadelphia Directory for 1861, 8vo; Bradbury's History of Kennebunk Port, 12mo, Kennebunk, 1837; Commercial Relations of United States, 5 vols., 4to, Washington, (Pub. Doc.); Handbook to the Museum of Phil. Acad. Nat. Sci., 12mo, pamph., Philadelphia, 1862.

WATERS, J. LINTON of Chicago, Ill. 15th Annual Rep. of Trade and Commerce of Chicago, for 1863, 8vo, pamph.

WHEATLAND, MRS. B. Boston Daily Transcript, July to Dec., 1863, 1 vol., folio.

WHEATLAND, STEPHEN G. 45 Pamphlets.

WYMAN, T. B. of Charlestown. Genealogy of the Hunt Family, 4to, Boston, 1862-3.

BY EXCHANGE.

AMERICAN ANTIQUARIAN SOCIETY. Proceedings at meeting, Oct. 21, 1863, 8vo, pamph., Boston, 1863.

BOSTON SOCIETY OF NATURAL HISTORY. Proceedings, vol. IX, Sig. 15, 16, 17, 18, 19; Journal, vol. VII, No. 4.

CANADIAN INSTITUTE at Toronto. The Canadian Journal for Jan. 1864.

CHICAGO HISTORICAL SOCIETY. Hibbard's Discourse, "A Spiritual ground of Hope for the salvation of the country," 8vo, pamph., Chicago, 1863; Several Reports of the Sanitary Commission of Illinois.

EDITORS. Historical Magazine for Jan. Feb. and March, 1864, New York, 1864.

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EDITORS. The British American for January, February and March, 1864, 8vo. Toronto 1864.

IOWA STATE HISTORICAL SOCIETY. Iowa Legis. Doc.; House Journal, 1854, 1856, 1858, 3 vols. 8vo; Senate Journal, 1854, 1856, 1858, 3 vols., 8vo; House Journal, Extra Session, 1856, 1 vol., 8vo; Iowa Laws, 1848, 1856, 1860, 6 vols., 8vo; Iowa Legis. Doc. 1859-60, 1 vol., 8vo; Iowa Journal of Constitutional Con., 1857, 1 vol., 8vo; Iowa Constitutional Debates, 1857, 2 vols., 8vo; Iowa Census Returns, 1857, 1 vol., 8vo; 4th An. Report of Iowa State Agricultural Society, 1858, 1 vol., 8vo; 16 Miscellaneous pamphlets.

LONG ISLAND HISTORICAL SOCIETY. Clark's Onondaga, 2 vols., 8vo, Syracuse, 1849; Stiles' Supplement to Hist. and Geneal. of Ancient Windsor, 8vo, Albany, 1863; N. Y. State Agr. Soc. Trans. 1861, 8vo; Longworth's Directory of New York, 1840-1, 12mo; William's N. Y. An. Reg., 1831, 1832, 1833, 1834, 1836, 1837, 6 vols., 12mo; Brown's History of the Shakers, 12mo, Troy, 1862; 12 pamphlets.

MONTREAL SOCIETY OF NATURAL HISTORY. The Canadian Naturalist and Geologist, Dec. 1863.

NEW YORK STATE LIBRARY, TRUSTEES OF. Laws of New-York, session 1863, 1 vol. 8vo; Journal of Senate, session 1863, 1 vol. 8vo.; Documents, Senate, session 1863, 5 vols. 8vo; Journal Assembly, session 1863, 1 vol. 8vo.; Documents, Assembly, session 1863, 9 vols. 8vo; N. Y. State Agr. Soc. Trans. 1862, 1 vol. 8vo.; N. Y. Med. Soc. Trans. 1863, 1 vol. 8vo.; Am. Inst. Trans. 1862, 1 vol., 8vo.; 16th Annual Report on State Cabinet, pamph. 8vo.

PHILADELPHIA ACADEMY OF NATURAL SCIENCES. Proceedings for August, Sept., Oct., Nov., Dec., 1863.

PUBLISHERS. North American Review for Jan. 1864.

MONDAY, APRIL 4. Evening meeting.

The President in the chair.

Donations were announced to the Library and Cabinets.

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Letters were read, from J. L. Hanaford of Watertown, accepting membership; and from Wm. Graves of Newburyport, on business matters.

Rev. G. D. Wildes gave an account of Queen Elizabeth's yacht, and showed, by a drawing on the black board, that in model and rigging it very nearly resembled the North River Sloops of the present day.

He suggested that an account of the different kind of vessels used from the early settlement of the country to the present day would be a valuable contribution to our commercial history.

A. C. Goodell Jr. called attention to the late discovery of a sunken vessel near Yarmouth on Cape Cod, supposed to have foundered there in 1623, which illustrated the manner of building at that period.

F. W. Putnam, in reply to questions, described the characteristic form of the breast bone of swimming birds and the different modes of progression among fishes. Mr. Putnam alluded to the erroneous views in regard to moths, as recently given in the newspapers and gave an account of the various species which are so destructive to furs, carpets, cloths, &c.

Voted; that the committee, appointed on the 7th of March, on the Constitution and By-Laws, be requested to nominate a list of officers for election at the annual meeting.

MONDAY, APRIL 11. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Adjourned to Monday Evening the 18th inst.

MONDAY, APRIL 18. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library and Cabinets announced.

Letters were read, from Thomas Morong of Lanesville and B. F. Mudge of Quindaro, Kansas, accepting membership; from Long Island Historical Society, Smithsonian Institution, and George A. Ward relating to books transmitted to the Library;

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Messrs. Ticknor and Fields on business matters; from David Choate in reply to queries proposed; from Miss M. B. Derby accompanying a donation of a Burmese Idol sent from India in 1825, by her brother the late Capt. Alfred F. Derby; from James T. Tucker, of the staff of General Banks, relating to a donation to the Historical Department, of the envelope, franked by President Lincoln which enclosed his recognition of the election of Governer Hahn of Louisiana.

Rev G. D. Wildes exhibited a piece of stone taken from a window sill in Kenilworth Castle, and made some interesting remarks about that celebrated place. Mr. W. also exhibited several views of the house in which Shakespeare was born and of other interesting localities in the vicinity of Stratford upon Avon, and gave a description of the same.

The remarks of Mr. Wildes called forth a general discussion upon the life and writings of Shakespeare.

F. W. Putnam mentioned that Mr. James H. Emerton had found a female Lump Fish *Cyclopterus lumpus*, having matured eggs, just on the point of being laid, and had made an estimate of their number, which amounted to 258,372. Five hundred eggs weighed 43 grains.

Col. J. H. Wildes, Asst. Surveyor General of California was elected a Corresponding Member.

Voted to adjourn to Monday evening, the 25th inst.

MONDAY, APRIL 25. Evening meeting.

The President in the chair.

Donations were announced to the Library and Cabinets. Letters were read, from Newburyport Public Library and Pennsylvania Historical Society, acknowledging the receipt of publications; from Messrs. Crosby & Nichols of Boston, and Henry A. Smith of Cleveland, Ohio, on business matters; from Mrs. P. A. Hanaford in relation to holding a Field Meeting in Reading.

F. W. Putnam, from the Committee on the Constitution and

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By-Laws, submitted the first reading of the amendments to the Constitution to be acted upon at the annual meeting.

Mr. Putnam read a communication from A. S. Packard Jr. of Brunswick, Me., entitled "The Humble Bees of New England, and their parasites, with notices of a new species of Anthophorabia, and a new genus of Proctotrupidæ." Referred to the Publication Committee.

The subject which occupied a portion of the last meeting, and which had engrossed the attention of the Literary and Historical Societies during the past week, the ter-centenary birth day of Shakespeare, was resumed, remarks being made by the chair, Messrs. Wildes, Beaman and others.

John Kilburn of Salem was elected a Resident Member.

MONDAY MAY 2. Evening Meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Cabinets and Library were announced.

Letters were read, from Henry Saltonstall of Boston, Justin Rideout of Boston, L. Saltonstall of Newton, and the Postmaster of Boston, on business matters; from the Misses Derby, relating to a donation of books to the Library; from the Mass. Historical Society, acknowledging the receipt of publications; from John Kilburn, accepting membership.

A variety of May-flowers having been placed upon the table, and the subject of May-day festivals having been alluded to, the Chair remarked that the return of another May-day, with its accompanying festivities, invites us to consider the pleasant change now working in the public mind of New England with regard to the observance of this ancient holiday of our Motherland.

The very name of May, not less than the practices used to usher in the month, runs back into the obscurity of antiquity. The poet Ovid, whose surmise has been generally adopted, derives it from the names of several Roman deities, among whom is the fair Maia, the mother of Mercury. But there are, on

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the other hand, some reasons to support the conjecture that the name is of Teutonic origin; and, as this conjecture neither wounds our vanity nor conflicts with history, we may safely assume it to be the true one, and so unbridle fancy to carry back our May-day festivals beyond the time of the Heptarchy, into the woods of Germany, and among those hilarious wild-men, the primitive ancestors of our Saxon stock.

Whatever gave rise to the ceremonies of May-day—whether they are a relic of the early "mythology of the Teutonic peoples," or a continuation of the *Floralia* of the Romans, or a Christian festival in honor of the Blessed Virgin, as has been variously supposed by different investigators of the subject—all are agreed that, in England, at least, they are of so ancient observance that "the memory of man runneth not to the contrary;" and that, universally, they symbolize the joy of mankind at the triumph of the Sun over the frosts and barrenness of Winter.

The celebration of the May-games was extremely distasteful to the Puritans and other early reformers in the English Church; and, doubtless, the many excesses of the revellers—the wantonness and debauchery inseparable from these festivals—were sufficiently scandalous to all pious and moral men. Latimer, who suffered martyrdom in the reign of Mary, discloses another objection to these pastimes in a sermon preached before the young King Edward against the popular observance of Robin Hood's day, which, he complains, sometimes drew all the parish away from church. "I thought," he mournfully says, concerning an instance of this kind within his own experience, "my rochet would have been regarded; but it would not serve, it was faine to give place to Robin Hood's men."

The Puritans were certainly not steeled against all the sweet influences of nature, nor backward in their enjoyment and praise of the beauties of Spring; and it was the chief of Puritan poets whose "Song on May Morning," remains to this day unapproachable in its excellence.

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But the Puritans were not blind to the evils already alluded to, and, moreover, it is clear that they considered the May-pole to be a relic of those heathen rites performed by the ancients in their worship of the goddess Flora: it was for this reason that Philip Stubs arraigned the May-games in 1595, in his "Anatomie of Abuses;" and for this reason sixty years later, Thomas Hall made them the subject of his "*Funebria Floræ*; or, Downfall of May-games," &c. Here, in New England, our good old Governor Bradford, of Plymouth, also condemned them for the same reason.

Not long after the landing of the Pilgrims at Plymouth some events occurred in their neighborhood, which called forth an official denunciation of May-day festivities, by the colonial authorities; and the rebuke was administered in so emphatic a manner that, if it has not effectually prevented a repetition of these ceremonies for all time, in New England, it has, at least, brought upon them a stigma which the lapse of two centuries has not wholly removed.

The Chair then proceeded to give an account of "Thomas Morton, of Clifford's Inn, Gent."—as he styles himself in his "New English Canaan"—and of the famous May-day revels at "Ma-re Mount," now Mount Wollaston, in Quincy, which were celebrated under his direction in 1626.

After detailing the particulars of the action of the colonial authorities against Morton, the dispersion of his followers and the destruction of his plantation, the Chair narrated the principal known facts of his subsequent career down to the time of his death at York in Maine, in 1646, and stated that this first May-day jubilee continued to be, for generations, the last. There had been May-day festivities in Maine before the affair at Mt. Wollaston, and there is some reason to suppose that Morton was a participant in those revelries; but, after his expulsion, and the destruction of his plantation at "Mount Dagon" no Puritan father was ever offended by the sight of the scandalous altar of Flora enticingly set up before the innocent eyes

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of his children. But the times are greatly changed since the dark and troubled days of the Pilgrims. There is now, happily, no need of ceaseless vigilance and the most sensitive jealousy in guarding a tender faith from the two-fold danger of relapsing into error or being contaminated by new and specious fallacies. Around our morals, our faith, our liberties, as their great bulwark of safety, modern science has thrown a network of invulnerable truths till old besetting evils have lost their power of harm forever.

No prejudices, then, based on the experience of an age remote and quite unlike the present, should be suffered to interfere with the celebration of the pleasant and pure festivities which of late years are beginning to be observed on May-day, in some parts of New England. It is to be hoped, rather, that we shall add some day in May to the list of legal holidays, and that, from the St. Croix to where "Mine Host of Ma-re Mount" sleeps under the brow of Agamenticus, and thence to Mount Wollaston, where he held his revels, and so along the entire boundary of our Union, May morning will evermore be held sacred to the celebration of the sun's return, the bursting of green buds and the birth of the flowers.

The wild flowers exhibited at the meeting, by those who went a-maying, were described by G. D. Phippen in the following manner:

Hepatica triloba, which differs but slightly from an anemone, is one of the earliest plants that has any pretensions to beauty, and is found in oaken woods, peeping up among the dried leaves, in close proximity with drifts of snow. It was mentioned by Higginson in 1629, and described by Josselyn in his New England Rarities printed in 1672, as "Noble Liverwort, one sort with white flowers and the other with blew." The Rev. Dr. Cutler mentions it in 1784, and Collinson writes to Bartram of Philadelphia in 1739, that "out of some mould sent with other plants has come up your Hepatica."

Anemone nemorosa, or Wind Flower. This little flower or

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a co-species was described centuries ago by Pliny, and long before Gerard wrote "That this floure doth neuer open itself but when the wind doth blow." Darwin says—the wind "gives its ivory petals to expand." It certainly is shy of opening and only occasionally when warmed by the sun, not forced by the wind,

> It "looks up with meek, confiding eye,
> Upon the clouded smile of April face,"—

are words beautifully expressed by a poet much nearer home.

Epigœa repens, called Mayflower, and Forefather's-flower, is fast becoming well known and much used of late as a souvenir present at this season of the year, and is associated historically with the ship Mayflower of Pilgrim fame, which however we believe to be of recent application. This flower commends itself both for its delicious, spicy fragrance, as well as its beauty, and is destined to find a place in literature as well as science.

Caltha palustris, Marsh Marygold, grows on the border of brooks, has a brilliant golden cup, and first flowers about the 22d of April.

> "In that soft season when descending showers
> Call forth the *greens* and wake the rising flowers."

It is called also May-blouts, or May-blobs, and all the poetry of so fine a posy often subsides into a mess of *greens*, as it is a favorite dish with many.

Old Parkinson says "It joyeth in watery places and flowereth somewhat early." All the old botanists describe it, such as Clusius, Bauhin, Tournefort, Clayton and some with figures. Cutler imputes the yellowness of butter to the cows feeding upon it.

Aquilegia canadensis, or Columbine, was noticed by the early travelers to America, and is well described and figured by Cornuti soon after the settlement of Canada,

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and through him obtained its specific name; it has been from that day highly prized by the botanists and florists of Europe. Parkinson says, "it was brought out of Virginia by Master John Tradescant, and flowereth somewhat earlier than any of the garden kinds, usually by a month." There is a remarkable locality of this showy flower on the hills of the Great Pasture on the east side of the road, which is much frequented by the young during the vacation of this month, who returning with bunches of them in their hands, remind us—

"That spring is here, the delicate footed May,
With its slight figures full of leaves and flowers."

Sanguinaria canadensis, Blood-root, appropriately named, as may be seen by breaking the root, which is rarely avoided in digging them up. This fine flower, as large as the Ox-eye daisy, has a deserved place in many gardens, where it gradually increases and elevates its numerous and paper-white flowers in a flat surface over the plant about four inches above the ground. Its singular root is used extensively in medicine, and probably worthily so, and the plant is often figured in medical books. Its large and deeply lobed leaves give to the plant, throughout the summer, a tropical appearance. It was carried to England and cultivated as early as 1680. Linnæus wrote to John Ellis from Upsal in 1765, "If you see Mr. Lee, ask him for the Sanguinaria, which I know is to be had in England, though I have not received it from any of my correspondents."

Violets. Two or three species of this well known genus can now be obtained from the fields. They are celebrated both by the exact botanists and the idealist. Pliny says. "There be some wild and of the field; others domestical and growing in our gardens. Garlands made of violets and set upon the head resist the heaviness of the head

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and withstand the overturning of the brain, upon overdrinking; yea, the very smell thereof will disperse such fumes and vapors, as would trouble and disquiet the head."

Gerard, alluding perhaps to the Pansy, then called Herb Trinitie, says they "have a prerogative above others, not only because the mind conceiveth a certain pleasure and recreation by smelling and handling them, but they bring to a liberal and gentle minde the remembrance of honestie, comelinesse and all kind of virtues." An eastern poet has said of this flower,

> "It is not a flower; it is an
> Emerald bearing a purple gem."

Houstonia cærulea, one of the most common of the spring flowers, and a universal favorite, often called Violets,—a most delicate little biennial plant, its erect and very slender stem topped off with starry white or pale blue flowers with a yellow eye, and in masses often appearing like a thin sprinkling of snow over the fields.

It does not appear to have been introduced into the Kew gardens till 1785. It is figured in Curtis's Magazine and elsewhere.

Saxifraga virginiensis. One of Parkinson's seventeen tribes of plants are the "Saxifrages, or Break-stone Plants," so called from their habit of growing in the seams or crevices of rocks, not inaptly described by Josselyn as "The New England Dayzie or Primrose, the second kind of Navelwort in Johnson upon Gerard; it flowers in May and grows amongst moss upon hilly grounds and rocks that are shady." It is an Alpine plant, this and a cospecies, the S. nivalis, were among the very last flowers that greeted the eyes of Kane and his weary voyagers as they pressed onward toward the pole, beyond all vegetable life.

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Erythroneum americanum, most improperly and unhappily called "Dog's Tooth Violet," a fine locality of which can be seen in the low land among bushes near Legg's Hill and the Forest River road. It belongs to the Lily tribe, and it has been suggested that it be called May Lily. It has elegant glossy leaves, blotched with purple. Josselyn, in 1672, calls it "Yellow Bastard Daffodil; it flowereth in May; the green leaves are spotted with black spots." It was cultivated in England in 1665, and is mentioned in Rea's Flora.

Feathery Catkins, from the branches of Alders, Willows, Poplars and Maples, are now for a brief period shaking their pollen to the winds, and in their graceful beauty are well worthy of study. They are occasionally mentioned with much effect in the poems of Bryant, some of whose sweetest inspirations were caught under the swaying branches of his native woods.

Rev. G. D. Wildes gave an account of a recent celebration of May-day in England.

F. W. Putnam gave a summary of a paper, presented for publication by J. A. Allen of Springfield, entitled a "Catalogue of Birds found at Springfield, Mass., with Notes on their Migrations, Habits, &c., together with a List of those Birds found in the State not yet observed at Springfield." Referred to the Publication Committee.

The proposed amendments to the Constitution were read for the second time.

Charles D. McDuffie, of Salem, was elected a resident member.

WEDNESDAY, MAY 11. Annual Meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library and Cabinets were announced.

Letters were read, from S. F. Baird, William Stimp-

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son, J. A. Allen of Springfield and L Trouvelot of Medford, relating to the publications and the "Naturalist's Directory"; from J. E. Oliver of Lynn, N. B. Shurtleff of Boston, A. W. Dodge of Hamilton and C. F. Hartt of Cambridge, on business matters; from J. T. Rothrock of Cambridge transmitting a paper for publication in the Proceedings.

The reports of the Secretary, Treasurer, Cabinet Keeper and Curators were read and accepted.

The Secretary stated that the Society was never in a more flourishing condition than at present. The receipts from the assessments of resident members had been greater than in any preceding year, which was also the case in regard to the sales of publications. During the year thirty-seven resident, and twelve corresponding members have been elected. Six members have died, leaving the number of resident members three hundred and sixty-one. Biographical notices of the deceased members will be printed in the June number of the Historical Collections. The Secretary alluded in particular to the late venerable botanist, Dr. George Osgood of South Danvers, who had always taken an active part in the Field Meetings of the Institute, and who was extensively known as one of the Linnæan school of botanists.

Five field meetings were held during the past summer, in Swampscott, Amesbury, Salem, Newburyport, and Rockport, which were all fully attended, and acknowledged successful in the attainment of their objects. Throughout the winter months meetings were held at the Society's rooms on Monday evenings, alternating with lectures on Zoölogy from Mr. F. W. Putnam.

A course of twelve lectures was given under the auspices of the Institute, at Lyceum Hall during the last winter, as follows:—two from Prof. C. T. Jackson, on Min-

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ing; one each, from Mr. C. W. Tuttle, on Cometery Astronomy; Mr. Cleveland Abbe, on Astronomical Instruments; Capt. N. E. Atwood, on the Habits of our Native Fishes; Prof. Benjamin Pierce, on Cosmogony; Mr. Alpheus Hyatt, on the Mollusca; Mr. C. M. Tracy, on Berries; President Hill, on the Geometrical Curve; and Mr. A. E. Verrill, on Corals and Coral Reefs.

The publication of the Proceedings and Historical Collections has been continued during the year. Of the former, the first quarterly number of the fourth volume, under its new form, is ready for distribution to subscribers. The Historical Collections have now reached to number one of volume six.

The annual Horticultural Exhibition took place on the 23d, 24th and 25th of September, but owing to the great scarcity of fruit, of all kinds, the tables were not loaded as in former years, though many fine specimens were contributed, particularly of grapes, which included not only those varieties grown in the hot-house, but many choice seedlings raised by the industry and care of Edward S. Rogers, of Salem. The show of vegetables was unusually good and in great variety. Heretofore very little attention has been devoted in our exhibitions, to this class of horticultural products.

To the Library valuable additions have been made, during the year, consisting of 1603 volumes and pamphlets, received from one hundred and nineteen individuals and thirty-two societies, editors of journals, and the various departments of the State and General Government. The most valuable of the donations were, one from George A. Ward, consisting of 160 volumes in the various departments of History, and general reading: and another from the retiring Vice President of the Institute, James Upton, comprising 51 valuable volumes, principally relating to horticultural subjects.

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The Treasurer presented the following statement of the financial condition, for the year ending May, 1864.

GENERAL ACCOUNT.

Debits.

Athenæum Rent, half fuel, &c.	$491 77
Lectures, $237 76; Publications, $699 25,	937 01
Collecting Assessments, $16 50; Gas, $8 74,	25 24
Express and Postage, $24 68; Sundries, $30 22,	54 90
To Historical Account,	209 78
To Natural History and Horticultural Account,	42 47
Balance in Treasury,	7 04
	$1768 21

Credits.

Balance of last year's account,	39 36
Dividends Webster Bank, $40 00; Sundries, $15 60,	55 60
G. Andrews' Legacy, $190 00; Lectures, $311 55,	501 55
Sale of Publications,	497 70
Assessments,	674 00
	$1768 21

NATURAL HISTORY AND HORTICULTURE.

Debits.

Preservatives and Taxidermy, $29 22; Cases, $44 97,	74 19
Books, $30 76; Glass, $37 48,	68 24
Horticultural Exhibition,	42 12
	$184 55

Credits.

Horticultural Exhibition,	90 08
Dividends Lowell Bleachery,	40 00
" Portland, Saco & Portsmouth Railroad,	12 00
General Account,	42 47
	$184 55

HISTORICAL ACCOUNT.

Debits.

Binding, $236 08; Books, $12 00,	248 08
Repairing picture frames,	13 50
	$261 58

Credits.

Dividends Naumkeag Bank,	13 00
Coupons Michigan Central Railroad,	38 80
General Account,	209 78
	$561 58

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The Cabinet Keeper reported that the specimens in the Museum were in as safe a condition, as the crowded cases of some of the departments would allow. During the year, Mr. T. M. Pond has arranged, catalogued, and labelled the North American birds, and their nests and eggs. Mr. Horace Brown has done the same with the collection of Mammalia, and had commenced to catalogue the Osteological collection when other occupations prevented his completing the work. Mr. Charles H. Higbee has arranged the Mineralogical collection, and by his efforts much has been done to increase its value. The Reptiles have been partially catalogued and named. The snakes which were sent to Professor Jan of Milan have been returned in good condition, with his identifications. Among the specimens Prof. Jan found several unknown species, descriptions of which will appear in his great work on Ophidians, in which he will give full credit to the Institute for its assistance.

During the year, an Essex County Collection has been commenced with the intention to soon have the Natural History of our county fully represented and separately arranged.

The total number of donations to the various sections of the Department of Natural History, since the last annual meeting, amounts to one hundred and twenty-six, received from eighty-six persons; besides which, several exchanges have been made with the Museum of Comp. Zoölogy at Cambridge, and the Lyceum of Nat. History of Williams' College.

Mr. James H. Emerton, curator of Articulata, reported that the Insects had been looked over, the worthless ones discarded and the others carefully protected from injury. The large collection of Brazilian Insects had been arranged, according to their orders, in a case by themselves. The

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other pinned specimens have been arranged in tight boxes and drawers. The alcoholic specimens of Insects, Crustaceans, and Worms have been arranged in the central cases of the large Hall. The pinned specimens of Coleoptera, Orthoptera, and Hemiptera have been catalogued and as far as possible named. Of the Coleoptera there are 1212 species, and over 3000 specimens. Of Orthoptera, 155 species; Hemiptera, 169 species; Neuroptera, 40 species. Several hundred species of Diptera and over 2000 specimens of Lepidoptera, one half of which are from South America. The Lepidoptera have been partially named by Mr. S. H. Scudder while in the Museum of Comp. Zoölogy. The small collection of Bees has been named by Dr. A. S. Packard Jr. Several exchanges have been made with Messrs. Scudder and Packard. The collection of Spiders has been largely increased during the year, and the curator, who is specially engaged in studying this order of insects, requests contributions of specimens from all parts of the country for his work.

Mr. John Robinson, Curator of the Ethnological Department, reported that the collection under his charge had been rearranged during the year. There had been many valuable donations received from fifty-five persons. Several sub-departments have recently been commenced, and good progress thus far made in rendering them available for purposes of study and examination; the Curators request the coöperation of the members and friends of the Institution in aid of these objects, trusting that their appeal will meet with a hearty response, and that many specimens will be contributed, especially such as are evanescent in their character, and if not preserved at the time, soon disappear, and afterwards are very difficult if not impossible to obtain.

The Constitution and By-Laws as revised by the Committee were unanimously adopted.

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The following officers were elected for the ensuing year:

PRESIDENT.

ASAHEL HUNTINGTON.

VICE PRESIDENTS.

Of Natural History—SAMUEL P. FOWLER. *Of History*—A. C. GOODELL JR.
Of Horticulture—J. F. ALLEN.

SECRETARY AND TREASURER.

HENRY WHEATLAND.

LIBRARIAN.

NATHANIEL J. HOLDEN.

SUPERINTENDENT OF THE MUSEUM.

F. W. PUTNAM.

FINANCE COMMITTEE.

J. C. Lee, R. S. Rogers, H. M. Brooks, G. D. Phippen, Jas. Chamberlain.

LIBRARY COMMITTEE.

J. G. Waters, Alpheus Crosby, H. J. Cross, G. A. Ward, G. D. Wildes.

PUBLICATION COMMITTEE.

A. C. Goodell Jr., G. D. Phippen, Ira J. Patch, C. M. Tracy, Wm. P. Upham, R. S. Rantoul, F. W. Putnam.

LECTURE COMMITTEE.

A. C. Goodell Jr., Francis Peabody, G. D. Phippen, George Perkins, James Kimball, G. W. Briggs, F. W. Putnam.

FIELD-MEETING COMMITTEE

A. W. Dodge, C. M. Tracy, S. Barden, S. P. Fowler, J. M. Ives, G. D. Wildes, C. C. Beaman, E. N. Walton.

CURATORS OF NATURAL HISTORY.

Geology—H. F. Shepard; *Mineralogy*—C. H. Higbee;
Palæontology—H. F. King; *Botany*—C. M. Tracy;
Comparative Anatomy—Henry Wheatland; *Vertebrata*—F. W. Putnam;
Articulata—J. H. Emerton; *Mollusca*—H. F. King;
Radiata—Caleb Cooke.

CURATORS OF HISTORY

Ethnology.

William S. Messervy, M. A. Stickney, John Robinson, J. A. Gillis.

Manuscripts.

W. P. Upham, H. M. Brooks, S. B. Buttrick, G. L. Streeter, G. D. Wildes.

Fine Arts.

Francis Peabody, J. G. Waters, G. A. Ward.

CURATORS OF HORTICULTURE.

Fruits and Vegetables.

J. M. Ives, J. S. Cabot, R. S. Rogers, John Bertram, G. B. Loring, S. A. Merrill, W. Maloon, A. Lackey, G. F. Brown.

Flowers.

Francis Putnam, William Mack, C. H. Norris, Benj. A. West, Geo. D. Glover.

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On motion of Mr. G A. Ward, a committee, consisting of Messrs. G. A. Ward, R. S. Rantoul, George Perkins, E. N. Walton, T. M. Stimpson, Charles Davis, G. D. Wildes, S. P. Fowler, and W. P. Upham, was appointed to present the claims of the Institute upon the public for a more liberal patronage, so that it may be better enabled to accomplish the objects of its organization.

On motion of Mr. S. P. Fowler a committee was appointed to make a collection of card photographs of the members of the Institute. Messrs. S. P. Fowler, John Robinson, and D. W. Bowdoin were placed on this committee.

Mr. S. P. Fowler was requested to prepare a paper on the Ornithologists of America, for publication in the Proceedings.

THURSDAY, JUNE 9th. Ordinary Meeting.

J. G. Waters in the chair.

The following persons, having been nominated at a previous meeting, were duly elected Resident Members: William B. Parker, James S. Kimball, Edward H. Payson, S. W. Davis, Edward L. Perkins, George P. Farrington, Mrs. John Clark, J. Ford Smith, A. G. Cornelius, Charles Roundy, James F. Hale, E. F. Roberts, J. W. Roberts, David Perkins, Jeremiah Page, Henry Morton, Benj. M. Chamberlain, A. P. Amidon, all of Salem.

Additions to the Museum and Library during April, May and June, 1864.

TO THE NATURAL HISTORY DEPARTMENT.

BROOKHOUSE JR., ROBERT. Specimens of Glyptemys insculpta from Salem.

BURT, D. W. Male and female Attacus cecropia.

CHAMBERLAIN, JAMES. Eggs of a Mollusk and an Echinus from Beverly Bar.

CHIPMAN, R. M. Attacus luna from Salem.

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CLOUTMAN, CAPT. W. R. Snake from Yangtse River, Japan.

COLCORD, Mrs. H. M., of South Danvers. A Red-winged Black-bird from Danvers.

CONWAY, CAPT. Mounted specimen of White Owl.

COOKE, C. Dried Plants, Shells and Echini from Zanzibar, Africa.

Cross, H. J. Sponge from Marblehead Beach.

DAVIS, CHARLES, of Beverly. Young Eagle taken from the nest in Beverly, June 2d.

EMERTON, J. H. Insects, Helix, and 2 Salamanders from an Island off Manchester. 125 specimens, 91 species of Insects from Essex Co. 147 specimens, 32 species of Insects from Salem. A collection of Ants from Salem. 6 species of Insects and a Tree Toad from Danvers. Cyclopterus lumpus and Raia sp. from Nahant.

GLOVER, GEO. D. Attacus cecropia from Salem.

HUNT, Y. Attacus cecropia from Salem.

LAKE, ELEAZER, of Topsfield. A "Little Auk," *Phaleris microcerus* Brandt., female. Shot on Ipswich River in Topsfield, Apr. 8th.

LENDALL, ED. E., of Manchester. Coral found on Glasshead flats, Manchester.

LYCEUM OF NATURAL HISTORY OF WILLIAM'S COLLEGE. (In exchange) Skin of a Seal and several Bird's Skins from Greenland. Bird's eggs from Florida and Greenland.

MARKS, CAPT. T. 2 Saurians from Landana, S. W. C. Africa.

MUSEUM OF COMP. ZOOLOGY, Cambridge. (In exchange) 17 specimens, 9 species of North American Turtles.

MASON, MRS. G. R., of Lynn. 43 specimens of dried Seaweeds and 8 of Hydroids. Native.

NICHOLS, H. P. 117 specimens, 40 species of Insects, and a Snake from Salem.

NORTHEND, Miss L. H. 2 specimens Attacus cecropia from Salem.

PEABODY, ALFRED S., of Cape Town. Copper Ore from Cape of Good Hope. Set of pressed Ferns, Bulb of a plant, Seeds of the Blue Gum Tree, Hydroids and Barnacles from Cape Town, Africa.

POND, T. M. A Java Sparrow.

PORTER, EDW 3 Salamanders from Salem.

PUTNAM, F. W. A Series of Crystal Models. Lime Stone from Williamstown, Mass.

RANTOUL, R. S. Portion of an Indian's jaw from West's Beach, Beverly.

ROWE, JOSEPH. Specimens of Storeria DeKayi from Salem.

SMITHSONIAN INSTITUTION, Washington, D. C. A collection of 27 specimens of Building Stones and Minerals.

STONE, FRANK. A Bird and 2 Reptiles from Essex Co.

UNKNOWN DONOR. 2 Loons from ?

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VERRILL, A. E., of Cambridge. 42 species of plants from Anticosti and Grand Menan.

WATSON, F. P. Larvæ of Wasps from Salem.

WEBSTER, MRS. JOHN. Lime incrustation. Seeds of Plants. Eggs of Pyrula.

WEST, G. W. A collection of Ants and others Insects from Salem. 929 specimens, 80 species of Insects from Salem.

WHEATLAND, H. Iron Ore, Lime Stone and Slag from Allentown, Pa. Fishes and Salamanders from River Clarion, Elk Co., Pa.

WHEATLAND, SIMEON J. Attacus cecropia from Salem.

WHITE, G. W. 85 specimens of Insects from Salem.

TO THE HISTORICAL DEPARTMENT.

BROOKS, H. M. Picture of Gen. Abbot. Cartridge from Alexandria. Rebel School-book.

BROWN Jr., BENJ. Rebel war relics.

CLOUTMAN. W. R. Chop Sticks and Japanese Smoking apparatus. Brick from the Porcelain Tower of Nankin.

CURWEN, HENRY. Ancient Button. Chinese Pipe.

FARRINGTON JR., G. P. Rebel Equipments.

FELT, S. Q. Native Fan from the Philipine Isles. Chinese Chop-sticks.

GOODELL Jr., A. C. Coins from Half-way Rock.

HIGBEE, C. H. Rebel War Relics from Port Hudson.

KILBY, WM. H., of Eastport, Me. Postage Stamps.

KING, CAPT. JAS. B. Silver Ornaments from the ruins of the Inca city Kuamachuco.

MANSFIELD, WM. Grape and Canister Shot, Bomb, and Bullet, revolutionary relics.

MARKS, CAPT. THOS. A Ring of Native Copper, wrought by the Natives of the W. C. Africa.

PUTNAM, F. W. Calcutta Hookah.

PUTNAM, G. D. Breastplate of the 38th Staffordshire Reg't.

RICHARDSON, FRED. Buttons of the Bombay Artillery.

ROBINSON, JOHN. Chinese Kites.

SLOCUM, EBEN. Ancient set of Knives and Forks in a case. Ivory Cane.

VANVLECK, H. J., of Nazareth, Pa. 7 Bills of New Jersey Continental Money, and a number of Ancient Relics relating to the early history of Nazareth, Pennsylvania.

VENT, JAMES. Indian Arrowheads.

WILLIAMS, ISRAEL, (Estate of) Native War Implements of the Fejee Islanders. New Zealand Chief's Blanket and Native Basket. Sword taken from the Pirates on the coast of South America.

WILLIAMS, CAPT. Old Shot from Fort Sewell. Coins, Military Buttons and other Revolutionary Relics found at Ft. Pickering.

WHEATLAND, H. Relics from the Field of Gettysburg. 5 Catholic Medals.

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TO THE LIBRARY.

ALLEY, JOHN B. (M. C.) Message and Documents, 1862–3, 4 vols 8vo; Message and Doc. Navy Department, 1862—3, 1 vol. 8vo; Message and Doc. Dept. of State, 1863—4, 2 vols. 8vo ; do. Dept. of Interior, 1863—4, 1 vol. 8vo ; do. P. O. Dept., 1863—4, 1 vol. 8vo; U. S. Coast Survey, 1861, 1 vol. 4to ; Patent Office, Mechanical, 1860, 2 vols. 8vo ; do. Agricultural, 1861, 1 vol. 8vo ; Report of Commissioners of Agriculture, 1862, 1 vol. 8vo ; Reports on the Finances 1862—3, 2 vols. 8vo ; McClellan on the Army of the Potomac, 1 vol. 8vo ; Report on Armored Vessels, 2 vols. 8vo.

BARNARD, JAMES M , of Boston. Scilla de corporibus Marinis Lapidescentibus, 1 vol., 4to, Romæ, 1752; Griffith's Icones Plantarum Asiaticum, part IV, 1 vol. 4to, Calcutta, 1854. Griffith's Palms of British India, 1 vol. fol., Calcutta, 1850.

BOSTON, CITY OF. Boston City Documents for 1863, 2 vols. 8vo.

BROOKS, HENRY M The Drum Beat, published by the Brooklyn Fair. Feb., 1864.

BURROWS, THOS. H., Supt. of Schools, Penn. Pennsylvania School Reports for 1855, 1856, 1858, 1859, 1863, 5 vols., 8vo.

CLEVELAND, MISS M. S. Turner's North Carolina Almanac for 1864, 8vo, pamph. Also several Newspapers from Newbern, N. C.

COLBURN, JEREMIAH, of Boston. Lewis's Address N. E. Hist. Gen. Soc'y, Jan., 1864, 8vo, pamph. Albany, 1864.

COWLES, WARREN, Smethport, McKean Co., Penn. Penn. School Reports 1861, 1862, 2 vols., 8vo.

CURWEN, JAMES B. Scientific American, vol. VIII. Pamphlets 25.

DERBY, MISS CAROLINE R. Wagstaffe's Piety Promoted, 1 vol., 12mo, London, 1775 ; Phipps's The Original and Present State of Man, 1 vol., 8vo, New York, 1788. Life of Mary Neale, 1 vol., 12mo, Philadelphia, 1796. Introduction to English Grammar, 1 vol., 12mo, London, 1782. Penn's Primitive Christianity, 1 vol., 8vo, Philadelphia, 1783. Various Almanacs, Pamphlets, &c.

DOWNIE, MRS. ELIZABETH A. 16th Ann. Rep. Pittsburg Mercantile Library Association for 1864, 8vo, pamph.

FLETCHER, CHARLES. Boston Gazette for 1817, 1 vol., folio. Boston Weekly Messenger for 1813, 1 vol., folio

GILMAN, DANIEL C., of Yale College. Several pamphlets relating to Yale College.

GOLDTHWAITE, JOSEPH A. Carpenter on the Microscope, edited by Smith 1 vol., 8vo, Phila. 1856.

GOODELL JR., ABNER C. A Manifest Book began Sept. 5, 1774, ended Aug. 2, 1775, 1 vol., folio.

HANAFORD, MRS. P. A., of Beverly. Various Pamphlets and Newspapers.

JACKSON, S. C., of Boston. 17th An. Rep. of Mass. Bd. of Education, 1 vol., 8vo, Boston, 1864.

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JOHNSON, MRS. LUCY P. United States Commercial and Statistical Register—several numbers.

KILBY, W. H., Eastport, Me. 7th An. Rep. of Maine Bd. of Agri. 1862, 1 vol., 8vo. New Brunswick Almanac and Register, 1 vol., 16mo. Third An. Rep. of Bd. of Agri. of New Brunswick, 8vo. Maine Legis. Register, 1864. Memorials of the Centennial Anniversary of Machias, 1 vol., 8vo.

KIMBALL, MISS ELIZABETH. Liberator for 1863, 1 vol., folio.

KIMBALL, JAMES. Systems of Building Associations Examined, 1 vol., 4to. New Haven, 1856. Fisher's Marrow of Modern Divinity, 1 vol., 16mo, Boston, 1743. Proceedings of Grand R. Arch Chapter of Mass., from Sept., 1862 to Sept. 1863, 8vo, pamph.

KING, MISSES HANNAH and ELIZABETH. Winckler, Essai sur l' Electricite, 12mo, Paris, 1748. Aldini, Essai sur le Galvanisme, 1 vol., 4to, Paris, 1804. Helvetius, Oeuvres completes, vol. I, 12mo, London, 1777.

KING, HENRY F. Greeley's Art and Industry of the Crystal Palace, 1 vol., 12mo. Dana's Lead Disease, 1 vol., 8vo, Lowell, 1848. Clarke on the Microscope, 1 vol., 12mo, London, 1758. Ferguson on the Microscope, 1 vol., 12mo, Edin., 1858. Wood's Common Objects of the Sea Shore, 1 vol., 12mo, London, 1859. Gosse's Evenings at the Microscope, 1 vol., 12mo, New York, 1860.

LORD, N. J. Boston Post for Feb., March, April, and May, 1864.

NASON, WM. A., of Williams' College. Williams' Quarterly, 14 numbers. Pamphlets, 11.

METCALF, HIRAM, of Boston. The Metropolitan Catholic Almanacs, for 1851, 1853, 1854, 1855, and 1856, 5 vols., 12mo.

MOULTON, HENRY W. Specimens of the Blank Forms used in the Provost Marshal's office, 5th District, Mass.

MONTAGUE, WM. L., of Amherst College. Annual and Triennial Catalogues for several years.

PACKARD, A. S., of Brunswick, Me. Catalogue of Bowdoin College, Spring term, 1864, 8vo, pamph.

PAINE, NATH., of Worcester. 4th An. Report of Worcester Public Library, 8vo, pamphlet.

RHODE ISLAND, SONS OF, BY HENRY T. DROWNE. Oration and Poems before the Sons of Rhode Island in New York, May 29th, 1863, 8vo, pamph.

ROBERTS, DAVID. Rhee's Manual of Public Libraries, 1 vol., 8vo, Philadelphia, 1859.

SIBLEY, JOHN L., of Cambridge. Report on Library of Harv. Coll., Jan., 1864, 8vo, pamph.

SLOCUM, EBEN. Boston Patriot for 1812, 1 vol., folio.

STONE, BENJ. W. Manual of New York Legis., 1864, 1 vol., 16mo. 5th and 6th An. Report, of Commissioners of Central Park, New York, 8vo pamph. An. Report of the Comptroller of New York, Jan., 1864. 4th An Report of Com. of Public Charities 8vo, pamph., New York 1864.

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SOUTHER, HENRY, of Ridgway, Elk Co., Penn. Pennsylvania School Rep., 1860, 1 vol., 8vo. Annual Rail-Road Reports of Pennsylvania for 1864, 1 vol., 8vo.

THOMAS, ABEL C., of Hightstown, N. J. The Gospel of Slavery, 8vo, pamph., New York, 1864.

UNITED STATES TREASURY DEPARTMENT. Report on the Finances for year ending June, 1863, 1 vol., 8vo.

WARD, GEORGE A Census of the State of New York, 1855, 1 folio vol. Documentary Hist. of New York, 3 vols., roy. 8vo. Documents Col. Hist. of New York, 10 vols., folio. Colonial Records of Connecticut, 1636 to 1665, 1 vol., roy. 8vo. American Eloquence, 2 vols., roy. 8vo. Annals of San Francisco, 1 vol., roy. 8vo. Ditto of Salem, 2 vols., 12mo. Messages and Documents 30th Congress, 1 vol., 8vo. Ditto 1849, 1 vol., 8vo. Prescott's Mexico, 3 vols., roy. 8vo. Ditto Ferd. and Isabella 3 vols., roy. 8vo. Ditto Peru 2 vols., roy, 8vo. Miscellanies, 1 vol., 8vo. Wilkes' Exploring Expedition, 5 vols., roy. 8vo. N. E. Genealogical and Historical Register, 12 vols., 8vo. D'Aubigne's Reformation, 3 vols., 8vo. Morse's Universal Geography, 2 vols., 8vo. Graham's Hist. of United States 4 vols., 8vo. Wm. Ware's Julian, 2 vols., 12mo. Ditto Zenobia, 2 vols., 12mo. Dewey's Works 3 vols., 12mo. Ditto Sermons, 1 vol., 12mo. Headley's Washington and his Generals, 2 vols., 12mo. Ditto Two Wars with England, 2 vols., 12mo. Ditto. Adirondack, 1 vol., 12mo. Miscellanies, 1 vol., 12mo. Hannah Adam's Hist. of Religion, 1 vol., 12mo. Rupp's Hist. of Religion, 1 vol., 8vo. Covode's Investigation, 1860, 1 vol., 8vo. Coffin's Hist. of Newbury, 1 vol , 8vo. Brooks' Hist. of Medford, 1 vol., 8vo. Gage's Hist. of Rowley, 1 vol., 12mo. Young's Chronicles of Massachusetts, 1 vol., 8vo. Brazer's Sermons, 1 vol., 16mo. Osgood's Stud. of xn. Religion, 1 vol., 12mo. Lee's Memoirs of the Buckminsters, 1 vol., 12mo. Elder Brewster, Chief of the Pilgrims, 1 vol., 8vo. E. Watson's Men, &c. of the Revolution, 1 vol., 8vo. Hist. of Portsmouth, 1 vol., 12mo. Thom's Epistle to the Corinthians, 1 vol., 12mo. Gospel Visitant, 1 vol., 12mo. Simpson's Journey Round the World, 1 vol., 12mo. Frothingham's Sermons, 1 vol., 12mo. Verses by Rev. Jas. Flint D. D., 1 vol., 12mo. Sermons, do., 1 vol., 12mo Sermons by Rev. Thos. T. Stone, 1 vol., 12mo. Ballou on the Atonement, 1vol., 12mo. Playfair's Euclid, 1 vol., 12mo. Life of S. Judd, 1 vol., 12mo. Lay Preachers, 1 vol., 16mo. Beauties of Dr. S. Johnson, 1 vol., 12mo. Capt Canot 20 Years a Slaver, 1 vol., 12mo. Maj. Sam. Shaw's Journal, 1 vol., 8vo. Ralph Izard's South Carolina Revolution, 1 vol., 12mo. Owen's Foot Falls, 1 vol., 16mo. Chandler's Masonic Addresses, 1 vol., 8vo. Weem's Life of Washington, 1 vol., 16mo. Girard's College, 1 vol., 12mo. Patent Office Report for 1858, 1 vol., 8vo. Morison's Life of Judge Smith. of N. H., 1 vol., 12mo. Memoirs, &c. of Rev. W. B. O. Peabody, 1 vol , 12mo. Obsequies of President Monroe, 1 vol., 12mo. Catalogue of N. Y. Soc. Library, 1 vol., 12mo. Edward's Hist. and Poetry of Finger Rings, 1 vol., 12mo.

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Bellsham's Evidence of the xn. Religion, 1 vol., 12mo. Thatcher's Hist. of Plymouth, 1 vol., 16mo. Easte 2d vol. on l' ami de la Jeaneese, 1 vol. The Lost Prince (Louis 17th) Rev. Williams 1 vol., 12mo. European Magazine for 1792, 1 vol., 8vo. Memoirs of Thos. H. Perkins, by Cary, 1 vol., 8vo. Washington's Farewell Address, (Hist. of) 1 vol., 12mo. Dr. N. L. Frothingham's Metrical Pieces, 1 vol, 12mo. Stockdale's Brit. Peerage, 1 vol., 12mo. Do. Baronetage, 1 vol., 12mo. Parson's Life of Sir. Wm. Pepperrell, 1 vol., 12mo Obsequies, &c on Henry Clay, 1 vol., 12mo. Girard's Will Case, 1 vol., 12mo. Eliot's Biographical Dict., 1 vol., 12mo. Memoirs of General Chas. Lee, 1 vol., 16mo. John Adams' Cunningham Correspondence, 1 vol, 12mo. Brazer's Holyoke's Ethical Essays, 1 vol, 12mo. Combe on the Constitution of Man, 1 vol., 16mo. Jefferson's Notes on Virginia, 1vol., 12mo. Newhall's Letters to John Pickering on the Letters of Junius, 1 vol., 12mo. Letters to and from John Wilkes, 1762, 1 vol., 12mo. Dealings with the Dead, L. M. Sargent, 1 vol., 12mo. Emerson's Hist. of the First Church Boston, 1 vol., 12mo. Letters and Dispatches of Cortez 1 vol., 12mo. Willis's Idlewild, 1 vol., 12mo. The Landing on Cape Ann by Conant, 1 vol., 8vo. Travels in Holland, 1 vol., 12mo. Map of Holland, 1 map. Linda, (Slave) 1 vol., 12mo. Salads for the Solitary, 1 vol., 12mo. Notices on Duels by Sabine, 1 vol., 12mo. Memoirs of Lucien Bonaparte, 1 vol., 12mo. Furness' Discourses, 1 vol., 12mo. Bible News, 1 vol., 16mo. Notte's 50 Years in both Hemispheres, 1 vol., 12mo. Memoir of John W. Foster of Portsmouth formerly of Salem, 1 vol., 12mo. Life Thoughts of Henry Ward Beecher, 1 vol., 12mo. Dr. Farley's Unitarian Lectures, 1 vol., 12mo. Genealogical Register, 1 vol., 12mo. Irving's Life of Washigton, 5 vols., 8vo. Lives of American Merchants, 2 vols., 8vo. Quincy's Hist. of Harv. College, 2 vols., 8vo. Macaulay's Hist. of England, 2 vols., 8vo. Gasparin on the American Rebellion, 1 vol., 12mo.—Volumes, 161.

WATERS, J. LINTON, of Chicago. Adjutant General's Report, State of Illinois, 1 vol., 8vo, 1863. War Record of Illinois, to Oct. 1, 1863, 8vo, pamph Revised Charter of Chicago, 8vo, pamph. 1863.

WILDES, J. H., of San Francisco, Cal. 11th An. Rep. of San Francisco Mercantile Library Association for 1864, 8vo, pamph.

WILLIAMS, ESTATE OF THE LATE ISRAEL. Charnock's Biographia Navalis, vols. 1 to 5—5 vols., 8vo, London, 1794. Stavorinus's Voyage to the East Indies, 3 vols., 8vo, London, 1798. Whitman's Travels to Turkey, &c., 1 vol., 8vo, Philad., 1804. Turnbull's Voyage Round the World, 3 vols., 16mo, London, 1805. Naval Trade and Commerce, 2 vols., 8vo. Lathrop's Sermons, 1 vol., 8vo, Worcester, 1806. Wayland's Discourses, 1 vol., 12mo, Boston, 1833. Malham's Gazetteer, 2 vols., 8vo, Boston, 1797. Eustaphieve's Character of Peter the Great, 1 vol., 12mo, Boston, 1812. Demetrius Epick Poem, 1 vol., 12mo, Boston, 1818. Apontamentos Grammaticos e filologicos, 1 vol., 16mo, Boston, 1787. Voyage in Search of La Perouse, 2 vols, 8vo, London, 1800. Beatson's view of the War with Tippoo Sultana, 1 vol.,

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4to, London, 1800. Ware's European Pilot, 1 vol., Whitehaven, 1774.

Woodbury, Ezra J. The Works of Thomas Goodwin, 1 vol., folio, London, 1671.

BY EXCHANGE.

American Geographical and Statistical Society. Proceedings, vol. II, No 2, 8vo, pamph.

American Philosophical Society. Proceedings, vol. IX, Nos. 68, 69, 70.

Buffalo Young Men's Association. 28th An. Rep., 8vo, pamph.

Canadian Institute. Canadian Journal for Mch. and April.

Cincinnati Mercantile Library Association. 29th An. Report, 8vo, pamph., Cincinnati, 1864.

Editors. Historical Magazine, for April and May, 1864.

Editors. Round Table, Nos., 24 to 32.

Firelands Historical Society. Firelands Pioneer, vol. 5, 8vo.

Iowa State Historical Society. Annals, No. 6 for April, 1864.

Long Island Historical Society. Brooklyn Manual, for 1858–9, 1859–60, 1860–1, 3 vols., 12mo. Various Documents Relating to the Brooklyn Sanitary Fair, Feb., 1864. Fifty Pamphlets.

Museum of Comparative Zoology at Cambridge. Annual Report of the Trustees, 8vo, pamph., Boston, 1864.

Peabody Institute. 12th An. Rep, of the Trustees, 8vo, pamph.

Philadelphia Academy of Natural Science. Proceedings, Jan., Feb., Mch., April.

Publishers. North American Review, for April, 1864.

Publishers. Lynn Weekly Reporter. Lawrence American. South Danvers Wizard. Haverhill Gazette. Essex Banner. Toulumne Courier.

Rhode Island Historical Society. Rhode Island Colonial Records vols. 1 to 7, 7 vols., 8vo. 87 Pamphlets.

San Francisco Mercantile Library Association. 11th An. Rep., 8vo, pamph.

Smithsonian Institution. Smithsonian Miscellaneous Collections, vol. IV. Smithsonian Contributions to Knowledge vol. XIII. Annual Report, for 1862.

Zoologischen Gesellschaft, Frankfort, a. M. Der Zoologischen Garten, Nos. 7, 8, 9, 10, 11, 12 (1863,) and No. 1 (1864,)

Wednesday, July 6. Ordinary meeting.

Francis Peabody in the chair.

The following persons having been nominated at a previous meeting by Messrs. G. A. Ward, H. Wheatland and W. P. Upham, were elected Resident Members; Daniel

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Perkins, John Felt, William H. Jelly, John Chapman, Francis Boardman, Charles S. Rea, Joseph H. M. Bertram, Joseph H. Hanson, Nathaniel Brown, John H. Nichols, Edward A. Smith 2d, Francis Choate, Samuel R. Hodges, Theron Palmer, William H. Kehew, George G. Creamer, John P. Browning, Miss Elizabeth W. Treadwell, Miss Elizabeth C. Ward Jr., Thomas M. Saunders, Manuel Fenollosa, Mrs. John H. Silsbee, F. S. Peck, Jeremiah S. Perkins, Richard D. Rogers, Francis W. Tuttle, W. J. Stickney, Orrin F. Thompson, Henry Hale, Xenophon H. Shaw, John H. Downing, Willard Goldthwaite, John Francis Tuckerman, M. H. Hale, W Reith Jr., Jonathan Tucker, George C. Lord, George A. Fuller, Augustus Perry, Tristram T. Savory, E. A. Simonds, J. F. Almy, George B. Jewett, Harrison O. Flint, John P. Peabody, Henry Hubon, Henry G. Hubon, Ingalls K. Mackintire, Charles Sanders, Miss Caroline Saltonstall, James Manning, William B. Ashton, Henry K. Oliver, Nathaniel Brown Jr., Joseph F. Walden, Daniel C. Haskell, Daniel E. Clough, George P. Daniels, Charles Lamson, Peter Silver, Charles H. Glazier, George Bowker, Charles Bowker, all of Salem, and Samuel Porter of Beverly.

WEDNESDAY, JULY 13. Field meeting at East Saugus.

This meeting was attended by a company who arrived by the 10 A. M. train from Salem, Lynn, and other towns, and made their rendezvous at "Waverley Hall." From thence, dividing into parties, one pursued the route leading to "Round Hill" and the "Center," while another took a path on the easterly side of the river and visited "Pirates Glen" and other interesting spots adjacent. Others pushed their travels as far as "Dungeon Rock" in Lynn. At 3 P. M. the meeting was called to order, and Rev. S. Barden of Rockport was invited to preside during the absence of the constituted officers.

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The records of the preceding meeting were read, and letters were announced from the following:

A. Agassiz, of Cambridge; John H. Klippart, Sec'y Ohio State Bd. of Agriculture; J. Mayer & Co., of Boston; S. F. Baird of the Smithsonian Institution; Edward L. Graeff, of Brooklyn, N. Y.; E. T. Cresson, of Philadelphia; J. A. Allen, of Springfield; L. Trouvelot, of Medford; Henry White, of New Haven, Conn.; C. B. Richardson, of New York, relative to the publications. From the Maine Historical Society; Massachusetts Historical Society; Literary and Historical Society, of Quebec; Lyceum of Natural History, of New York; Corporation of Harvard College; Trustees of Newburyport Public Library; Trustees of Boston Public Library, severally acknowledging receipt of publications. From Jere. Page; Willard Goldthwaite; Charles Bowker; Francis Boardman; Geo. P. Daniels; W. J. Stickney; H. K. Oliver; M. Fenollosa; G. B. Jewett, accepting membership. From C. M. Tracy, of Lynn; Mrs. P. A. Hanaford, of Reading; S. H. Scudder, of Boston, relating to Field meetings. From Long Island Historical Society; A. S. Packard, of Me. Hist. Soc.; Henry W. Moulton; Smithsonian Institution, relating to exchanges and transmission of books and specimens. From J. Porter, of Wenham; Henry A. Smith of Cleveland, Ohio; Mrs. Hannah B. Russell; Morris Phillips, of New York; C. B. Preston, of Danvers; R. M. Piper, of Nahant; Lowell Bleachery; Geo. A. Ward, on business matters.

Donations to the Library and Cabinets, were announced. The chair proceeded to give an account of the geology of the place, as observed by him. He spoke of the "Jasper Ledge" of "Round Hill" and its amygdaloid, and of the fine porphyries of this region. At this point Vice President A. C. Goodell Jr. arrived and took the chair.

C. M. Tracy, of Lynn, described a variety of plants and flowers gathered during the day. A fine cluster of rhododendrons being sent to the table he gave some account of the family to which it belonged and of its peculiarly fine developement among the Alps and Himalayas. Also of the other splendid members of this family, the azaleas, the kalmias, the heaths, &c.

Wilbur F. Newhall, of Saugus, gave somewhat extended remarks on the more prominent points in the history of the town. He remembered the old Newhall Tavern formerly kept here by an ancestor of his, and famous in its

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time, and he recollected being carried, when a little boy, to see the old building torn down. At this tavern, as he had heard the story from an ancient dame, Washington once stopped during his journey, rested awhile, and only allowed himself a cup of cold water. Mr. N. also spoke of a series of articles on the history of the town, prepared by his late father Benj. F. Newhall, and printed in the Lynn Reporter, a reprint of which is under consideration.

Joseph Dampney, of Lynn, gave some further statements in the same direction, particularly as to the first church built in Saugus, which was at the "Center."

The chair said that Saugus was a place very interesting to the antiquary, and historian. Some of the ramblers of the day had probably seen the heaps of scoria at the "Center" called the "Cinder Bank." At that spot was established the first iron foundery in the country, the scene of the labors of Joseph Jenks, one of the pioneers of American inventors. It was he who first contrived and introduced the long stiff scythe now used by mowers; and we also find record to show that he invented an "engine for the more spedye cutting of grasse," for which he sought legislative encouragement. What this "engine" was does not well appear. The foundery was a success, it would seem, and a choice relic from it is yet preserved in the family of the late Alonzo Lewis, of Lynn, to wit, the first article cast, being a small quaintly shaped iron pot.

Rev. C. C. Beaman, of Salem, gave a brief account of the delightful scenery at and about "Pirate's Glen" and also adverted to the tribe of Indians who formerly dwelt hereabout. It was said that their camps might still be traced by the imbedded clam-shells in the soil; and there were some who could recollect the last of these easy, indolent, fish-eating people, as they lingered awhile among their civilized and more powerful successors.

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Rev. A. W. Bruce, of Marblehead, expressed his satisfaction at the proceedings of the day, and spoke further of the importance of preserving items of local history.

James H. Emerton, of Salem, made some statements as to the large collection of insects received by the Institute in the past year, and gave some suggestions on the preservation of specimens in this class.

P. L. Cox, of Lynn, testified to the pleasantness of the day's affairs, and paid a just and warm tribute to the memory of Benj. F. Newhall, the historian of Saugus.

Prof. John C. Holmes, of Michigan, gave some description of the tulip tree as found in that State (allusion having been made to the tree by Mr. Tracy.) He then spoke of the developement of the agricultural resources of the West, the transportation eastward of their products, and the necessity of increased facilities for this purpose.

W. P. Upham, made some remarks on the jasper and porphyry of this region.

Rev. C. C. Beaman, of Salem, called attention to the character and worth of the late Joshua Coffin Esq., the historian of Newbury, and on his motion, the Vice President of History was requested to prepare a memoir of that venerable author to be read at a future meeting.

On motion of Mr. Upham the thanks of the Institute were tendered to Messrs. Wilbur F. and Alston Newhall for their services as guides and otherwise, to the Proprietors of Waverley Hall and all our friends in Saugus for their kindness this day. Several persons were nominated for membership and the Institute then adjourned.

THURSDAY, JULY 14. Ordinary meeting.

G. A. Ward in the chair.

The following persons nominated at the Saugus meeting by Messrs. G. A. Ward, R. S. Rantoul and H. Wheat-

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land, were duly elected Resident Members; Abraham J. Stanley, Samuel Carlen, John Mackie, C. W. Richardson, W. C. Moulton, Charles Baker, J. M. Rice, Miss Annie Treadwell, Mrs. Mary Doyle, Mrs. Chas. Hoffman, Charles Sewall, Thomas P. Newhall, Robert McCloy, James Treffren, Fred. Porter, W. D. Northend, Julian A. Fogg, J. S. Cross, Andrew H. Lord, Charles Osgood, Mrs. D. A. Neal, all of Salem; S. S. McKenzie, of Topsfield; A. W. Bruce, of Marblehead; Wilbur F. Newhall, John W. Newhall, Harmon Hall, James S. Oliver, John Westwood, and Miss Charlotte M. Hawkes, of East Saugus.

WEDNESDAY, JULY 27. Field meeting at North Beverly.

A small company of those most actively interested repaired to the neighborhood of Wenham Pond in the morning, taking the early train as far as the little village of North Beverly. These spent the forenoon in various rambles in the vicinity and being joined by a large additional force from Lynn, Salem, and other places, at about 3 P. M. the regular meeting was organized on the westerly margin of the pond under a clump of venerable pines on the grounds of Richard P. Waters Esq. Vice President, A. C. Goodell Jr., took the chair and made a few remarks, explanatory of the objects of the Institute.

After the reading of the records of the last Field meeting, and the announcement of donations to the Library and Cabinets, letters were read from the following;

Trustees of Boston Public Library, acknowledging receipt of publications; W. F. Newhall, of East Saugus; A. W. Bruce, of Marblehead; D. C. Haskell, J. F. Walden and Mrs. J. H. Silsbee, of Salem, accepting membership; R. M. Piper, of Nahant; S. Barden, of Rockport, and Wm. Lafavor, of Salem, on business matters.

Robert S. Rantoul, of Salem, read an extended essay on the History and Uses of Wenham Pond. In his remarks he spoke of the remarkable purity of its water; its permanency of level; the enormous crops of ice taken from it

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and the esteem in which this product is held abroad; the many notable characters associated with it in history, particularly Rev. Hugh Peters; and the singular amount of litigation that had marked the adjoining territory in the course of years.

A short but very pleasing poem by Mrs. J. H. Hanaford, late of Beverly, but now of Reading, was read by Rev. Geo. D. Wildes of Salem who prefaced it with a few remarks. The Poem was descriptive of the emotion felt by an American in Europe on meeting with a specimen of the famous ice from these waters.

Stephen H. Phillips, of Salem, adverted to the very interesting fact that this was one of those "greate pondes," of more than ten acres in extent, whose entire freedom to all our people for fishing and fowling is guaranteed forever, first, by the "Bodye of Libertyes," drawn and promulgated by Rev. Nathaniel Ward of Ipswich in 1643, then by later enactments of the General Court, and now finally made a fixed fact by decision of the Supreme Court lately rendered. He read extracts from the manuscript opinion of the Court in the case of Inhabitants of W. Roxbury *vs.* Stoddard, bearing on this point. Thus, said Mr. P. we are in full posession of these lovely waters, for all legitimate public uses, free of cost and beyond hinderance by designing men; and this more than by all else, by the early foresight of Nathaniel Ward of Ipswich, known as the "Simple Cobbler of Agawam."

James Slade, late City Engineer of Boston, gave some interesting facts on the subject of furnishing water to cities, and said that when a tolerable source was selected, it was always found that the quantity provided by nature could be much increased by art, by the use of means to prevent loss and waste.

Rev. G. W. Skinner, of Gloucester, made some statements upon the remarkable ridge, or moraine, which runs

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along the shore of the lake, from near this spot to almost the northern end. He discussed its structure very fully and concluded that it was formed, during the period of drift, by the deposit of stones and gravel brought by ice-floes or field-ice, which here, restrained by the highlands, was forced to move for sometime in a kind of eddy.

C. M. Tracy, of Lynn, made some observations on the peculiar structure of the *Sarracenia* or Huntsman's Cup. He favored the idea that its pitchers, which are usually partly full of pure water, are reservoirs for the collection of dew, which may, by some natural means, be formed upon them more readily than upon other objects. The specimen before the meeting was from Cape Ann, and, despite the severe drought, had been found with its usual supply of water.

Prof. B. O. Pierce, of Beverly, had also examined the moraine spoken of by Mr. Skinner, and gave some considerations thereon, as also on the mollusca found in Wenham Pond.

Richard P. Waters, of Beverly, said this moraine had attracted the notice of Hitchcock who had pronounced it a wonderful formation; but he seemed not to have alluded to it in his writings.

Rev. C. C. Beaman, of Salem, gave some notice of the earlier proprietors of this region, and particularly of Rev. Mr. Fiske, one of the first clergymen in Wenham; also of the church records of that old parish which are still preserved.

Charles S. Osgood, of Salem, alluded to the kind entertainment given us this day, and moved the thanks of the Institute to the friends who had furnished it. The same were voted unanimously. After the nomination of several persons for membership the Institute adjourned.

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THURSDAY, JULY 28. Ordinary meeting

Vice President, A. C. Goodell Jr, in the chair

The following persons nominated at the North Beverly meeting by A. C. Goodell Jr., and H. Wheatland, were elected Resident Members; Isaac Appleton, of Beverly; Geo. P. Russell, of Haverhill; Shadrach M. Cate, Ephraim Miller, James C. Stimpson and George Newcomb, of Salem. The thanks of the Institute were voted to Mr. Rantoul for the reading of his paper, on the "History of Wenham Pond" at the meeting of yesterday, and a copy was requested for publication in the Historical Collections.

WEDNESDAY, AUGUST 10. Field meeting at Gloucester.

About three hundred persons arrived in the first train from Salem, and were escorted to the Town Hall where a few remarks of welcome were made by Rev. Mr. Skinner, of Gloucester, and the divine blessing was invoked by Rev. Mr. Banvard of Worcester. The party was then dismissed for rambles and observations. Some visited the "Stage Rocks" and "Rafe's Chasm"; others rambled along the beach or in the woods in search of plants and animals.

At one o'clock the party had mostly reassembled at the Town Hall, where after appeasing the good appetites caused by the morning walks, the meeting was called to order by Rev. S. Barden, of Rockport, who made a few opening remarks.

The records of the last Field meeting were read, and donations to the Cabinets and Library announced. Letters were announced from:

New Jersey Historical Society, acknowledging the receipt of publications; J. F. Tuckerman, of Salem, accepting membership; C. M. Tracy, of Lynn; A. P. Peabody, of Cambridge, and G. W. Skinner, of Gloucester, respecting Field meetings.

G. D. Phippen, of Salem, gave a brief account of the early history of Gloucester, and then spoke of the trans-

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mutation of species among plants, holding that, while under cultivation, plants were by the hand of man, changed, so as to produce well marked varieties, yet, if left to nature's own laws, every species would remain true to the characteristics stamped upon it by the Creator, at its first appearance upon earth.

Rev. E. C. Bolles, of the Portland Nat. Hist. Society, upon being introduced, made a most eloquent, and appropriate speech, advising all to study the works of God in the field, and open their eyes to the beautiful gems at their feet. Mr. Bolles stated that he had come from Portland with his fellow member of the Nat. Hist. Society, Mr. Morse, to see how a field meeting was conducted, and hoped that his own Society would be able to follow the example of the Essex Institute.

Rev. G. W Skinner, of Gloucester, exhibited, under a microscope, some infusorial earth found on the Cape, and explained the probable origin of the deposit.

Prof. Wm. Hinks, of University College, Toronto, C. W. was introduced to the meeting, and gave an interesting, general account of the lower animals and plants, during which he stated that he was inclined, with others, to admit a fifth branch to the animal kingdom, in which the sponges and allied organisms should be placed.

Rev. Joseph Banvard, of Worcester, gave an account of the Worcester Society which had similar objects with those of the Essex Institute, and had commenced to hold field meetings. In the Worcester Society, ladies are not only admitted as members, but are elected assistant curators, and take an active part in all the meetings of the Society, reading papers, and discussing the various subjects presented. Mr. Banvard stated that he had recently seen the ants feeding upon the juices secreted by the aphides, or plant lice, and that he had noticed three distinct species

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of ants, each of which lived upon the secretions of a peculiar species of aphis.

Ed. S. Morse, of Portland, whose especial study is the land snails, gave an account of the collection made by himself and Mr. Bolles during the morning, stating that he had found several specimens of two very rare species of minute snails. The structure of these little snails, furnished, like most of the larger species, with a shell, which is secreted by, and is a part of the animal itself, and not a house which it can leave at will, as is commonly supposed, was explained by drawings. He also showed the position and shape of the hundreds of microscopic teeth with which the snail's tongue is furnished for the purpose of rasping its food.

Mr. Morse read the following list of Terrestrial Mollusca collected at Gloucester during the morning.

Tebennophorus dorsalis *Binney*.
Limax campestris *Binney*.
Helix striatella *Anthony*.
" labyrinthica *Say*.
" arborea *Say*.
" chersina *Say*.
" lineata *Say*.
" milium *Morse*.
Helix ferrea *Morse*.
" Binneyana *Morse*.
" exigua *Stimpson*.
Vertigo ovata *Say*.
Pupa pentodon *Say*.
Succinea Totteniana *Lea*.
" avara *Say*.
Melampus bidentatus *Say*.

A. C. Goodell Jr., called the attention of the meeting to the little neglected barnacle on the rocks, and after giving an interesting description of its structure, which he illustrated by a drawing of that portion of the animal under the shell, he favored the meeting by reading a few stanzas, *found in his pocket*, relating to the little crustacean.

F. W. Putnam, of Salem, being called upon to explain the structure of the lobster and other animals that had been collected during the day, gave a brief account of the various animals, and by a comparison of the lobster with the young barnacle, which for a short period of its life, is a free swimming animal, showed how closely related were the two, and how erroneous was the common opinion,

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that the barnacle was a mollusk, on account of its limy shell.

Prof. A. Crosby, of Salem, gave an account of the walk taken by his party to the rocks, where many interesting things were discovered, and several kinds of minerals collected.

Rev. S. Barden, of Rockport, exhibited a number of the minerals that had been collected, and described the structure of each.

George F. H. Markoe, of Boston, explained the various properties of the medicinal plants which he had collected, and furnished the following list of plants seen during the day.

Drosera longifolia
Drosera rotundifolia.
Leucanthemum vulgare.
Maruta cotula.
Nymphæa odorata.
Nuphar advena.
Gaultheria procumbens.
Achillea millefolium.
Asclepias incarnata var. pulchra.
Platanthera blephariglottis.
Sambucus canadensis.
Mitchella repens.
Leontodon autumnale.
Arctostaphylos uva-ursi, in fruit.
Hypericum perforatum.
Hypericum sarothra.
Elodea virginica.
Silene inflata.
Statice limonium.
Clethra alnifolia.
Cuscuta Gronovii.
Eupatorium perfoliatum.
Epilobium angustifolium.
Epilobium lineare.
Cornus canadensis, in fruit.
Scutellaria lateriflora.
Spiræa tomentosa.
Spiræa salicifolia,
Œnothera biennis.
Œnothera pumila.
Antennaria margaritacea.
Eupatorium purpureum
Impatiens fulva.
Lobelia cardinalis.
Lobelia inflata.
Lobelia spicata.
Pontederia cordata.
Sagittaria variabilis var. sagittifolia.
Vaccinium oxycoccus.
Lythrum salicaria.
Xyris bulbosa.
Solanum dulcamara.
Oxalis stricta.
Trifolium repens.
Trifolium pratense.

James H. Emerton, of Salem, exhibited a collection of about an hundred species of insects, including many species of spiders, the object of his special study, that had been collected by him during the day.

Rev. E. B. Willson, of Salem, made a few general remarks upon the usefulness of these meetings in promoting the study of Nature.

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Henry W. Peabody, of Salem, was nominated for Resident Membership by A. C. Goodell Jr. and H. Wheatland.

On motion of Mr. Goodell the thanks of the Institute were voted to the Selectmen of Gloucester, for the use of the Town Hall during the day, and to Rev. G. W. Skinner and other friends in Gloucester, for kind attentions. Adjourned.

THURSDAY, AUGUST 25. Field meeting at Rockville, South Danvers.

A company of pleasant size and character gathered this day at the little chapel at "Rockville" for a series of refreshing rambles in the neighborhood of our old familiar "Ship Rock." Some of the party started for Bartholomew's Pond; others proposed to find "Wildcat Ledge" on the declivity of Prospect Hill near the line of Lynn; and some went to Spring Pond and the Aqueduct Fountains. The largest portion, probably, as generally happens, took the shortest walk, and ended their jaunt at "Ship Rock." The iron ladder and steps, provided by the Institute, are still in good order; and the shady woods around were very refreshing for a hot and dusty day.

The afternoon meeting was organized in the chapel; Rev. S. Barden, of Rockport, taking the chair. On so doing, he remarked that we had brought stones, plants and animals, and displayed them on and about the sacred desk. It might seem as if this apparent desecration needed some apology, but to him, at least, it was evident, that no antagonism existed between these elements, but most beautiful harmony. True, we seldom see it exemplified in this way. The works of God are never opposed to his word; and Nature teaches nothing in support of irreligion or vice.

The records of the last meeting were read and dona-

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tions to the Library and Museum announced. Letters were announced as received from the following persons and Societies, since the last meeting:

Julian A. Fogg; John P. Browning; George P. Russell, of Haverhill; J. H. Wildes of San Francisco, accepting membership: James D. Dana, of New Haven, respecting Ordway's "Tree Protector": B. Westermann & Co. of New York; J. A. Allen, of Springfield; Raynal Dodge, of Newburyport, relating to the publications; J. D. Dana, of New Haven; James Hubbert, of Toronto; S. F. Baird, of the Smithsonian Institution; James Hall, of Albany; Vincent Barnard, of Chester Co. Pa.; Charles H. Pitman, of North Barnstead, N. H.; Wm. Dawson, of Spiceland, Ind.; Amory L. Babcock, of Sherborn; Geo. C. Huntington, of Kelley's Island, Ohio; James Lewis, of Mohawk, N. Y.; John Johnston, of Middleton, Conn.; John Haywood, of Kingston, Ohio; W. M. Beauchamp, Skaneateles, N. Y.; Wm. Muir, of Fox Creek, Mo., relating to the Naturalists' Directory: S. Jillson, of Feltonville; E. S. L. Richardson, of Chicago, Ill.; P. A. Hanaford, of Reading, on business matters.

The chair then spoke of the geology of this region; and said that he had been able to-day to verify the observation made by Messrs. Alger and Jackson in 1848, of scratches and groovings on the ledge under the eastern base of Ship Rock. These clearly proved it a bowlder; since there must have been a time when it stood elsewhere, and other materials were doing this grinding work in the place it now occupies. Under the well known rock in Gloucester called the "Whale's Jaw," similar markings are to be seen, proving the same thing. If any one doubted that such rocks had ever been transported, or that ice was an adequate agent for such work, he had only to visit Cape Cod in the winter, when in one of its harbors it might be seen at play, as it were, with a great stone, carrying it rods away and back, this way and that, with every tide.

F. W. Putnam exhibited the various animals which had been collected and explained the characters of the bream, perch and shiner, showing in what way the shiner differed from the other two, and how the perch and bream

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belonged to two closely allied families. He stated that the three species under consideration had a wide geographical range, only equalled by one or two other North American fishes, being found in almost all the ponds and lakes east of the Rocky mountains and south of the Arctic regions. He also made some brief statements as to the nature and habits of the several kinds of batrachians such as frogs, toads, and salamanders.

C. M. Tracy, of Lynn, made some explanation of the plants collected by the explorers, particularly of the composite family, which make ten per cent. of the world's vegetation, and were well represented to-day, by a prodigious thistle, some six feet high. A few moments were spent in considering a variety of plants reputed to cure the bite of snakes and other venomous animals. Some of them, it was stated, probably possessed a degree of virtue, while others would be but idly employed for such a purpose.

Rev. Joseph Banvard, of Worcester, said that he had seen to-day, fresh evidences of that grand principle of Nature, that all life is nourished by decay. Death and dissolution are everywhere before us. The animal dies, the plant perishes, and both are turned to mould. The rock weathers and disintegrates. Ship Rock itself is crumbling. From the dust of all decaying structures, a new order and generation of things, sentient and otherwise, springs constantly up, to fill a place and enjoy a time in the universal history. So in all things. In a sense wholly legitimate, we have lived for years on the blood and bones of our Revolutionary Fathers. To-day we are called to fertilize the soil anew with sacrificial blood, that life and enjoyment may arise for future generations. These things are often more literal than we think. When, some time ago, there was opened the grave of good old Roger Williams, the root of an apple tree was found to have travelled to

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the head of the coffin and penetrated all along the spine, and thence branched down the legs to the feet, being thus nourished by the material of the bones. And therefore those who ate of that tree had been unwittingly partaking of the very substance of the old Reformer. Nor in all this is there anything abhorrent to a fine and merciful sense. Nature destroys with sudden stroke, mostly, all things that can feel. She saves pain, she shows no malevolence, but only kindly transfers the life from one form to another.

Prof. A. Crosby, of Salem, gave some account of the operations of the Portland Natural History Society. This institution has excellent accommodations, and is about commencing a system of Field Meetings, much on the plan of our own. A curious feature at their rooms, is the grand table, eleven feet long by six wide, made of a single plank from the "Big Tree" of California. Prof. C. also spoke of the facilities afforded by these meetings for educational purposes, and for acquaintance with things around us which are too rarely seen in schools.

E. N. Walton, of Salem, spoke in continuation of the same subject.

The Secretary read a letter from Rev. Charles Babbage, chaplain in the army, in relation to Wenham Pond, giving some curious anecdotes of that locality, and the former residents thereabout.

On motion of C. M. Tracy of Lynn, the thanks of the Institute were voted to the Proprietors of the Rockville Chapel for the use of their premises to-day; also to the friends in the village who have favored us with their assistance and encouragement.

Henry W. Peabody of Salem, nominated at a previous meeting, was elected a resident member.

The Institute then adjourned.

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FRIDAY, SEPTEMBER, 16. Field meeting at Newburyport.

This meeting had been appointed for the previous Wednesday, but postponed on account of dull weather. The company from the lower towns of the county, arriving by the morning train was quite large.

Under the efficient guidance of the Rev. G. D. Wildes, the large company were at once placed upon the route for visiting the most interesting objects in Newburyport and its neighborhood. A small party of the members whose interest was more immediately connected with the botanical and mineralogical departments, left the cars at the "Serpentine Quarry," returning thence in time for the collation and public meeting. After a general gathering at the City Hall, some of the party went on a delightful trip to Plum Island; others chose to stroll over the bridge, and enjoy the fine walk and views on the Salisbury side, and the remainder proceeded to visit the Church and Memorial Chapel of St. Paul's. The latter structure attracted special attention, from the connection with the memory of a deceased clergyman and his daughter, held in affectionate remembrance by many friends in Salem. The exquisite memorial windows of the Chapel placed as monuments to their dead, by several families of St. Paul's parish, may certainly be regarded as among the finest specimens of the stained glass to be found in this country.

From the Chapel, the party were next conducted to the beautiful grounds of the Dexter mansion, which were thrown open to them through the kindness of the proprietor, Dr. E. G. Kelley. In other particulars than this, the Institute, as on previous occasions, found themselves greatly indebted to the courtesy of Dr. Kelley. After spending some time in these grounds, the party proceeded to the Mall, the Putnam School, and thence to the beautiful Oak Hill Cemetery. None could fail to admire the

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new gateway, just erected through the generous gift of Mr. Tappan of New York, a native of Newburyport. None could fail to be struck with the beautiful inscription wrought in the granite entablature. We understand that the inscription was furnished by Mrs. Tappan, the daughter of the late C. W. Story Esq., of Newburyport, and we record it, as itself a testimony to a tasteful and pious culture long known to her friends:

"Until The Day Break,
And The Shadows Flee Away."

From the elevated portions of the cemetery, beautiful and extensive views of the surrounding country were obtained, embracing on the south and west the hills of West Newbury, Rowley, Ipswich, and Old Town; on the east and north the headlands of Cape Ann, the sandy shores of Plum Island, Salisbury, and Hampton; the distant Isles of Shoals, and the woods and hamlets of Salisbury, Seabrook, with the towns of Amesbury and West Newbury. After leaving the Cemetery, the Copley paintings were visited at the house of the Misses Tracy, who very kindly threw open their mansion to the large party, and furnished much valuable information as to the history of the portraits of Colonel and Mrs. Lee. Another fine portrait by Trumbull of Col. Jackson, the ancestor of the distinguished Jackson family of Boston, was seen at the same place. From this point, the route was taken to the old South Church, passing by the way the old colonial jail house in Federal street. Many of the party visited the tomb of Whitfield, where the remains of the great preacher, together with those of Prince and Parsons, were seen. After testing the quality of the whispering gallery in the church, the party proceeded to the old Tracy Mansion, once honored by the presence of Washington, Talleyrand, Chateaubriand, Louis Philippe, LaFayette and others.

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This venerable mansion, now occupied, in part by the Rev. Mr. Fletcher, the distinguished traveller in Brazil, is soon to be used for the purposes of the Public Library; alterations to that effect being now made. We hope to see in connection with the valuable Public Library of Newburyport, a flourishing branch of the Essex Institute.

After viewing other localities of interest as connected with the literary, professional and commercial history of the city, the party returned to the City Hall, where the large hospitality of their friends in Newburyport had made excellent provisions for a noonday repast.

The afternoon meeting was called to order in the City Hall, about 2 1-2 o'clock, and Rev. George D. Wildes, of Salem, was invited to occupy the Chair. On assuming that place he made some remarks in explanation of the plan and practice of the Institute and the influence exerted by its meetings on the community around.

Donations since the last meeting were announced and letters were read from the following:

A. S. Packard Jr., of Brunswick, Me.; G. C. Huntington, of Kelley's Island, Ohio; J. D Dana, of New Haven; J. A. Allen, of Springfield; Thomas Barlow, of Canostota, N. Y., in relation to the publications; Smithsonian Institution, acknowledging the receipt of publications; Lyceum of Natural History of New York; S. Barden, of Rockport; W. H. Prince, of Northampton; John L. Russell; Mrs. E. H. Derby, of Auburndale, on general business; A. L. Babcock, of Sherborn; Thos. Gile, of Washington; Hiram A. Cutting, of Lunenburg, Vt., on exchanges of books and specimens.

F. W. Putnam, explained the structure of the galls found on the leaves and stems of plants, and the habits of the gall flies. He also spoke of the habits of the Aphis, Coccus and other insects injurious to vegetation.

Rev. S. Barden, of Rockport, had been to the "Devil's Den." But there was nothing there infernal; it was a place of unmixed beauty. He was glad to see the clergymen of this place interested in the pursuits of this day;

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they have saved Newburyport to the cause of science. While laboring with his hammer at the ledge he had been cheered by the presence of some of them, and encouraged to open more fully the wealth of that spot. There were beautiful specimens of serpentine, as well as asbestos, or amianthus of a fine description. He exhibited an elegant vase made from the serpentine by Mr. Osgood, of Newburyport, and pronounced it equal to anything of the kind to be seen elsewhere.

Dr. H. C. Perkins, of Newburyport, said that every boy in the place had at some time been to the "Devil's Den," which few here know as a serpentine quarry. It was opened for lime exclusively and worked for some time. It furnished besides serpentine and asbestos, some very good steatite and dolomite. The celebrated Jacob Perkins, once of Newburyport, made paper from this asbestos and printed some bank-notes on it which were incombustible and served to surprise his friends.

Rev. Artemas D. Mussey, of Newburyport, expressed his deep satisfaction in the meeting and its purposes. He could not doubt its effect on those who attended, especially on the young; and he hoped a branch society, or something like it might be formed and sustained in this place.

Rev. J. S. Spalding, of Newburyport, had fortunately met the party at the "Den" and highly enjoyed the enthusiastic activity of those who composed it. If all the members of the Institute were equally engaged and successful, the best results must follow. There are young men in Newburyport engaged in science and natural history. They have made fine collections of birds' eggs including many rare kinds and if directed and encouraged by some systematic society, they would do much for themselves and the cause of knowledge.

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Rev. C. C. Beaman, of Salem, thought the Essex Institute could not fail to be greatly cheered by such language as that of the Newburyport people to-day. The historical side of our society well deserves encouragement. We are at work to preserve a worthy past by gathering and securing every relic of historic value.

Rev. Mr. Spalding, said that Essex North was rich in archeological wealth. Its history was both valuable and available. Felt, in his annals, had made some statements as to John Barnard, a celebrated teacher of the early times; but recent researches have corrected him in this matter and identified parties very differently.

Rev. John N. Sykes, of Newburyport, was glad to see the activity of the young men who took part in the operations of the Institute. The benefit of such employment in youth must be great. They would form habits of observation, which in after life would be of the greatest advantage.

C. M. Tracy, of Lynn, gave some explanation of the plants gathered by the explorers, alluding in particular to the asters, goldenrods and other autumnal flowers, and discussing somewhat the relations of the oaks and hickories. He also spoke of his visit to the garden of Dr. E. G. Kelley, in which were noticed, among the many interesting objects there found, the beautiful and finely grown hedges of hemlock, spruce and other evergreens also one of weigelia, this last in the time of flowering must have presented a splendid appearance.

Dr. Perkins said every one ought to study Natural History. It was the greatest source of comfort amid pain, sorrow and affliction, that he had ever known. When the botanical specimens were just now brought forward, they seemed to him like old friends. He remembered that forty years ago, he left Cambridge with a classmate and botanized from thence to Newburyport, losing the way in the ardor of the pursuit.

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The Chair added some further thoughts on the Institute as a means of education. Such an institution forms the best of safeguards for the young and developing minds. The love of science will live every where. He had seen, in the icy fastnesses of the Alps, the little band of German students, on their vacation from the Universities, camping in the mountain valleys and enjoying their explorations with a zest that made him almost envious. Yet this enjoyment is not all, for modern science is not pleasurable only; it is eminently practical and therefore eminently useful. Encourage its growth among the people and you give them at once both happiness and power.

Stephen B. Ives, of Salem, offered the following resolutions, which were unanimously adopted.

Resolved, That the sincere thanks of the Essex Institute be presented to the City Council, of Newburyport, for the use of the City Hall, for its meeting here this day.

Resolved, That the most grateful acknowledgements of the Institute be presented to those kind friends in Newburyport, whose attentions in making the most ample, and tasteful arrangements for the field meeting, and, in providing bountiful and elegant refreshments, have rendered the present meeting among the foremost in interest and encouragement in the history of the Society.

Resolved, That the thanks of the Institute are especially offered to Mrs. D. T. Granger, Mrs. Pearson, Mrs. Nourse, Mrs. W. Horton, the Misses Tracy, of the ladies; and to the Messrs. G. J. F. Colby, E. S. Moseley, E. G. Kelley, D. T. Granger, Charles Wills, C. H. Bailey, J. H. Frothingham, J. Bogardus, J. Horton, and others who have so largely contributed to the gratification of the Institute in its present meeting.

After the nomination of members the meeting adjourned.

WEDNESDAY, SEPTEMBER 21. Ordinary meeting

Joseph G. Waters, in the chair.

William Whitaker, Thomas L. Perkins and William H.

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Emmerton, of Salem, and John S. Allanson, of Marblehead, nominated at a previous meeting were duly elected Resident Members.

FRIDAY, SEPTEMBER 30. Special meeting.

The President, A. Huntington, in the chair.

The president stated that the object of our assembling this evening was to take some suitable notice of the recent sudden decease of our late associate member GEORGE ATKINSON WARD, of Salem. Mr Ward was one of the original members and very active in the organization of the Essex Historical Society. He removed to New York in 1823 to engage in business in that metropolis. He returned to Salem, in November last to spend the remainder of his life among the scenes and friends of his youth; since that time he has renewed his interest in the doings of the Institute and by his zeal and industry has largely contributed to its success.

Rev. George W. Briggs moved that a committee be appointed to prepare resolutions and a memoir to be presented at some future meetings, accompanying the same with appropriate remarks.

Francis Peabody, in seconding the motion, alluded principally to Mr. Ward's previous residence in Salem, his interest in the Institute and in all measures conducive to the intellectual and moral culture of his native place.

Rev. George D. Wildes stated that his acquaintance with Mr Ward was recent, but during that time he had seen much of him both in his walks and in visits to his home, and bore testimony to his worth and character as a citizen and a friend.

A. C. Goodell Jr. followed in remarks of a similar import and suggested that the committee consider the propriety of providing a portrait of Mr. Ward to be placed in the rooms of the Institute.

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The motion of Mr. Briggs, seconded by Mr. Peabody and amended by the suggestion of Mr. Goodell, was unanimously adopted, and Messrs. C. W. Upham, A. Huntington, A. C. Goodell Jr., G. W. Briggs and Francis Peabody were appointed on said committee.

On motion of Mr. F. Peabody, Mr. C. W. Upham was appointed, in place of Mr. G. A. Ward deceased, on the committee to which was referred the "consideration of the authenticity of the tradition that the frame of the old Building in rear of Boston street is that of the first meeting house in Salem."

The committee on resolutions was authorized to call meetings whenever it may be prepared to report. Adjourned.

Additions to the Museum and Library during July, August and September, 1864.

TO THE NATURAL HISTORY DEPARTMENT.

ALLEN, J. A., of Springfield. 32 specimens, 9 species Reptiles from Spring field. 1 specimen Trout, young.

BABCOCK, AMORY L., of Sherborn. (In exchange) Several fresh water Shells. Specimens of Gryllotalpa borealis and other Insects and Spiders, 3 Jumping Mice, Embryos of Native Birds from Sherborn, Mass. Body of Little Ant-eater and several Nuts from Surinam. Fossil Coral from Kansas.

BARDEN, REV. STILLMAN, of Rockport. Specimens of Pyrhoclose, Smoky Quartz, Pyrites, Fluorspar, &c., from Rockport.

BOLLES, REV. EDWIN C., of Portland, Me. 8 Specimens Helix hortensis from Broom Corn Island, Casco Bay. 3 valves of Pecten icelandicus, 4 do. of Mytilus edulis, 3 do. of Saxicava distorta *Say*, 3 do. of Astarte laurentiana *Lyell*, from the Post Pliocene, Canal St., Portland, Me. 3 Specimens of Macoma fusca, 4 do. Muscula antiqua *Mighels*. 11 do. Leda portlandica *Hitchcock*, from the Post Pliocene, Land Slide, Westbrook, Me.

BOWDITCH, MRS. REBECCA. Specimen of Limax from Salem.

BRIGGS, MRS. ADALINE, of S. Danvers. 2 Specimens Attacus cecropia.

BROWN, BENJ. Fossil coral.

BROWN, HORACE. Specimen A. cecropia.

BYRNES, CLIFFORD C. 2 specimens Slag. Iron found among coal.

CARLEN, SAMUEL. Brown Bat taken in Salem.

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CHIPMAN, R. MANNING. Flowers of Linnæa borealis from Westford, Mass.

CREAMER, MRS. F. M. Cones and twigs from the "Great Pine of California," also a string giving the exact circumferance of the tree from which they were taken.

DERBY, MRS. M. A., of Auburndale. Deer's horns from Minnesota. Specimen of coral.

EMERTON, JAMES H. 112 specimens, 44 species Insects, collected at the field meeting in East Saugus, June 13. 23 specimens Insects, 23 specimens 2 species Ants, 1 larva of Cicindela from Salem. 58 specimens, 34 species Insects collected in Beverly. 132 specimens, 74 species Insects collected at the Gloucester field meeting.

EMMERTON, W. H. Specimen of Walking-stick, Bacunculus femoratus, from Salem.

FARRINGTON, MISS A. W. B. Specimen of Attacus cecropia from Salem.

FLINT, G. F. Specimens of Eudryas grata.

FROST, MRS. L. A. Clay from Talahama, Tenn.

GOODELL JR., A. C. Nest of Wasps from Ipswich.

GRANT, HENRY. Fossil Mollusks from Lake Champlain.

HALL, CAPT. W. H. 6 Starfishes and Embryo Whale from West Coast of Africa.

HAMMOND, CAPT. JOSEPH. Fishes, Crabs, Starfishes and Mollusks from Baker's Isle, South Pacific. Flying-fish, North Atlantic. Several Fishes, Crustaceans, &c., from off the coast.

HANAFORD, MRS. P. A. Specimen of Chauliodes pectinicornis.

HASKELL, JOSHUA, of Marblehead. 5 specimens of Insects collected at the field meeting at Wenham Lake.

HIGBEE, CHARLES H. 8 specimens of Solitary Bees and specimen of Attacus Promethea from Salem.

KIMBALL, MRS. ENOCH F., of Wenham. Nest of Chimney Swallow.

KING, H. F. 4 specimens, 2 species Coleoptera from Gorham, N. H.

LAKE, CHARLES H, U. S. V. Specimens of Galena, Blende, Pyrites, Mica, Limestone, Tourmaline, Hematite and Fossils from the vicinity of Little Rock, Arkansas.

LEAVITT, MRS. Larva of Cerura borealis from Lexington.

LEE, JOHN C. Humming Bird from Worcester.

LEFAVOR, JOSEPH. Specimen of Cicada pruinosa.

LEWIS, I. P. Large Pearl from a Quahaug.

LORD, GEORGE R. Specimen of Monohammus sp.

LOWD, MARK. Nest and specimens of Hornets.

MERCHANT, ADDISON, of Gloucester. Barnacles and Shells from Banks of Newfoundland.

NICHOLS, H. P. 297 specimens, 148 species Insects, 2 malformed Hen's eggs, 40 specimens 3 species Salamanders, 20 specimens Fish, collected in Bethel, Vt. 73 specimens, 40 species Insects from Salem.

OSGOOD, J. C. Nest and eggs of a Wren from Salem.

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PARKER, CHAS. Specimen of Walking-stick, living female.

PEASE, W. H., of Honolulu, Sandwich Isls. 29 species of Land Shells from Tahiti. 71 species of Marine Shells from the Pacific Islands. Several specimens of each species, all named and several types of new species.

PERKINS, HENRY W. Full grown larvæ of Attacus cecropia.

PUTNAM, F. W. 2 specimens of a large Aphis, with eggs and cast off skin from Salem. Quartz, Pyrites with gold, from Rangely, Me. 49 specimens of Spiders from the northern parts of Maine.

PUTNAM, CAPT. W. H. A. Collection of over 500 specimens of Coral and several Shells from Singapore, E. I. 2 specimens Forficula. Several hundred Crustacea and several Fishes from soundings off the coast.

ROBINSON, ASA P., Specimen of Nepa from Grafton Lake, Me.

ROBINSON, JOHN. 73 specimens, 50 species Insects from Salem.

RUSSELL, JOHN W. Full grown larvæ of Attacus cecropia.

SAFFORD, JOSHUA. Coal with vein of Sulphuret of Iron.

SAVAGE, MISS. Specimen of Walking-stick, female with eggs, from Salem.

SILSBEE, WILLIAM. Nest of Hornets with about 1000 specimens in different states of growth.

SMITH, HENRY. Specimen of Prionus laticollis.

SMITH, LAWRENCE P. Specimen of Attacus cecropia.

STICKNEY, M. A. Specimens of Pterogorgia and Plexura from the Cape Verd Islands.

STONE, FRANK. 85 specimens, 34 species Insects from Salem. Specimen of young Turtle from North Reading.

STONE, DR. LINCOLN R., U. S. A., Gallipolis, Ohio. Specimen of Sphinx quinquemaculata from Gallipolis.

SIMONDS, S. S. Specimens of Pelecinus sp. and Philampelus satellitia from Salem.

TRACY, C. M., of Lynn. Specimen of Scolopendra sp.

TRUE, JOSEPH. 13 specimens, 4 species Hymenoptera from Salem.

WATSON, FRANK. Specimen of Monohammus sp. from Salem.

WHITE, GEO. M. 60 specimens of a Beetle from Milkweed, Salem.

WILSON, MISS ALICE. Specimen of Cicada pruinosa from Salem.

TO THE HISTORICAL DEPARTMENT.

CHAMBERLAIN, JAMES. 2 Postage stamps, Cape of Good Hope and Victoria.

CHIPMAN, R. M. Grains of Corn from the grave of an Indian supposed to have been buried 400 years.

CREAMER, GEO. G. Piece of the Stone steps down which Gen. Putnam rode when pursued by the British during the Revolution, Greenwich, Conn.

FELT, S Q. Piece of Palmetto wood from the Rebel ram Merrimac.

HAMMOND, CAPT. JOSEPH. Model of Canoe and native Spear Sandwich Is.

PUTNAM, PERLEY, (Estate of) 8 Weapons from the Feejee Islands.

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PUTNAM W. H. A. 10 cent Postage stamp of Netherlands India.

RANTOUL R. S. Netherland Copper Coins.

WATERS, R. PALMER, of N. Beverly. Helmet of a British soldier.

WILLIAMS, ———. 4 shot, 2 fragments of shot and 1 fragment of Cannon from the old Ft. Pickering, Salem.

TO THE LIBRARY.

ADAMS, SAMPSON & Co, of Boston. N. Y. State Business Directory, 1 vol. 8vo, New York, 1859. Fall River Directory, 1864, 1 vol. 16mo. Taunton Directory, 1864, 1 vol. 16mo. Lawrence Directory, 1864, 1 vol. 16mo. Manchester Directory, 1864, 1 vol. 16mo. Charlestown Directory, 1864, 1 vol. 16mo.

CLOUTMAN, WM. R. Hoffman's Shopping Dialogues in Japanese, Dutch and English, 4to. London, 1861. Van Reed's collection of Phrases in English and Japanese, 1 vol. 8vo.

DROWNE, CHARLES, of Troy, N. Y. Annual Register of the Rensselaer Institute, 1864, 8vo, pamph.

FOOTE, CALEB. Files of the County Papers for several months.

GIBBS. J. W., of New Haven. Family Notices by W. Gibbs of Lexington, 8vo, pamph. 1845.

HANAFORD, P. A., of Reading. Bible Society Record, nine numbers. Dwight's Open Converts, 1 vol. 16mo, New York, 1836. Stone, W. L., Matthias and his impostures, 1 vol. 16mo, New York, 1835. 22 Pamphlets, also several Newspapers.

HOLDEN, N. J. Proceedings of Am. Anti-Slavery Society at its 3d decade. 8vo, pamph. New York, 1864.

HOLMES, JOHN C. 2d Annual Rep. of Secretary of Michigan State Board of Agriculture, 1 vol. 8vo. Lansing, 1863. Boston Daily Evening Traveller, for 1850, 2 vols. folio.

HOLMES, THOMAS, (Estate of) Historie de France par Anquetil, 15 vols. 16mo, Paris, 1822. Memoires pour Servir a l' histoire de France sous Napoleon, Tom 1—6 ; Tom 2, notes—7 vols. 8vo, Paris, 1823. Gourgaud's examen critique de l' ouvrage de Segur, 1 vol. 8vo, Paris, 1825. Bonnycastle's Algebra, 1 vol. 12mo, Phil., 1806. Letellier Grammaire Francoise, 1 vol. 16mo, Tournay, 1816. Gilleland's Counting House Assistant, 1 vol. 12mo, Pittsburg, 1815. Spanish Grammar by Jos. Giraldel Pino, 1 vol. 12mo, Phil., 1795. Veneroni's Complete Italian Master, 1 vol. 12mo, London, 1791. Bonnefoux, Seances Nautiques, 1 vol. 8vo, Paris, 1827. Several Log Books. Pamphlets, &c.

KLIPPART, J. H., Cor. Sect'y Ohio State Bd. of Agric. Ohio Agricultural Reports for 1853, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 8 vols. 8vo.

MANN, Miss ELIZABETH N. Andover Advertiser, from 1857 to 1863 incl. 7 vols. folio.

MANNING, R. C. Cooper's Surgical Dictionary, 2 vols. 8vo, New York.

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1832. Ballou's Candid Review, 1 vol. 12mo. Orton's Discourses, 1 vol. 12mo, Boston, 1816. 14 Pamphlets.

MORSE, EDWARD S., of Gorham, Me. Observations on the Terrestrial Pulmonifera of Maine, by E. S Morse, 8vo, pamph., Portland, 1864.

MUDGE, B. F., of Quindaro, Kansas. 1st Cat. of Officers and Students of Kansas State Agric. College 8vo, pamph. 3d Ann. Rep. of Sup't. of Public Instruction of Kansas, 8vo, pamph. Cat. of Baker's University. The Rocks of Kansas, by Swallow and Haven, 8vo, pamph., St. Louis, 1858.

MUNSELL, JOEL, of Albany. Catalogue of Library of Philom. Soc. of Union College, 1863, pamph. Baker's Address to Chem. Soc. of Union Coll. July, 1863. Annual Catalogue of Columbian Coll. 1862—3. Albany Female Academy Report of Exam. June, 1863. Twenty-five pamphlets.

NASON, WILLIAM A., of Chicago, Ill. The Gulielmensian No. 8, May, 1864. The William's College Quarterly for June, 1864.

PACKARD, A. S., of Brunswick, Me. Catalogus Collegii Bowdoinensis, MDCCCLXIV, 8vo, pamph.

PACKARD JR, A. S., of Brunswick, Me. Synopsis of the Bombycidæ of U. S. A., by A. S. Packard Jr. 8vo, pamph.

PARSONS, G. W. "The Cartridge Box," printed at U. S. Army Hospital, York, Pa, 1864, several numbers.

PHILLIPS, STEPHEN H. Proceedings of National Union Convention at Baltimore, June, 1864.

PUTNAM, ELBRIDGE. The old Franklin Almanac for 1860—64 inclusive, 8vo, pamph.

PUTNAM, MRS. EBEN. Several Pamphlets.

PUTNAM, PERLEY, (Estate of) Nouvel Abecedaire, 1 vol. 12mo, Phil., 1811. Reuss on the trade between Great Britain and U. S. A., 1 vol. 8vo, London, 1833. Duane's Infantry Regulations, 1 vol. 8vo, Phil., 1813. Life of Moreau, 1 vol. 12mo, New York, 1806. Rawson's Military Duty, 1 vol. 8vo, Dover, 1793. Hawney's Measurer, 1 vol. 12mo, Baltimore, 1813. Steuben's Regulations 1 vol. 12mo, Boston, 1802. Vose's Astronomy, 1 vol. 8vo, Concord, 1827. Fisher's Military Tactics, 1 vol. 8vo, New York, 1805. Gray on the Revelations 1 vol. 12mo, Newburgh, 1818. Trial of Gen. St. Clair, Aug. 25, 1778, 1 vol. fol. Phil., 1778. History of Revolution in France, 1 vol. 8vo, Boston, 1794. 79 Pamphlets.

SLOCUM, EBEN. Cooper's Naval History, 2 vols. 8vo, Phil., 1840. Ditto continued to 1853, 1 vol. 8vo, New York ,1853. Browne's Whaling Cruise, 1 vol. 8vo, New York, 1846. Frost's Naval Biography, 1 vol. 8vo, Phil., 1844.

STONE, BENJ. W. Philadelphia Directory, for 1848, 1855, 1859, 1860, 1861, 1862, 6 vols. 8vo.

SWETT, JOHN, of San Francisco. 1st An. Rep. of Sup't. of Pub. Instruction of California, 8vo, pamph. Sacramento, 1863.

SYMONDS, EDWARD. Several Almanacs.

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TITTLE, Miss S. J., of Beverly. 12 Pamphlets.

TRASK, Amos. Moore's Navigation Improved, 8vo, pamph. Salem, 1815.

TUCKER, Col. JAMES T., U. S. Volunteers. Journal and Proceedings of a Convention for a Revision of the Constitution of Louisiana, 8vo, pamph. New Orleans, 1864.

TUCKER, JONATHAN. Opening Address by the President at Illinois State Agric. Soc. Fair at Decatur, 1864, 8vo pamph.

TUCKER, WILLIAM P., of Portland, Me. Catalogus Collegii Bowdoinensis, MDCCCLXIV, 8vo, pamph.

UNITED STATES, DEPARTMENT OF STATE. Diplomatic Correspondence, 1863, 2 vols. 8vo, Washington, 1864.

WADE, Misses, of Ipswich. Frisbie's Oration on Restoration of Peace, in 1783, 8vo, pamph. Dana 's Eulogy on Washington, 1800, 8vo, pamph.

WARD, CHARLES. Journal of Commerce Jr. for several months. Essex Statesman vol. 1 fol. Salem, 1863—4.

WARD, GEORGE A. The Giles Memorial by John A. Vinton, 1 vol. 8vo, Boston, 1864.

WATERS, J. LINTON, of Chicago. Annual Statement of Receipts and Expend. of Chicago, from Apr. 1, 1863 to Apr. 1 1864, 8vo, pamph. Catalogue of Library of Chicago Young Men's Association, 8vo pamph. Chicago, 1856, ditto 1859. Chicago Revised Charter, 8vo, pamph. 1863. 30 Pamphlets.

WIGHTMAN, W. J., of Reading. 11 School and other Reports of Reading.

BY EXCHANGE

AMERICAN ANTIQUARIAN SOCIETY. Lincoln's Address on C. C. Baldwin, 8vo, pamph. Jenks' Address Oct. 23, 1813, 8vo, pamph. Proceedings at Meeting April 1, 1864, 8vo, pamph.

AMERICAN PHILOSOPHICAL SOCIETY. Proceedings, vol. IX, No. 71.

CANADIAN INSTITUTE. The Canadian Journal for July, 1864,

EDITORS. Historical Magazine, for July, Aug., and Sept, 1864.

IOWA STATE HISTORICAL SOCIETY. The Annals of Iowa for July, 1864, 8vo, pamph.

LONG ISLAND HISTORICAL SOCIETY. 1st An. Rep. of Directors, Librarian, &c., May, 1864, 8vo, pamph.

MONTREAL SOCIETY of NATURAL HISTORY. Canadian Naturalist and Geologist, for Feb., Apr , June and Aug., 1864.

NEW JERSEY HISTORICAL SOCIETY. Proceedings vol. IX, No. 6, 8vo, pamph.

NEW YORK LYCEUM OF NATURAL HISTORY. Annals vol. VII, Nos. 13—16. Vol. VIII, No. 1.

NEW YORK MERCANTILE LIBRARY ASSOCIATION. 43d Annual Report, July, 1864, 8vo, pamph.

PHILADELPHIA ACADEMY OF NATURAL SCIENCE. Proceedings for May, June, July and August, 1864.

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PORTLAND SOCIETY OF NATURAL HISTORY. Proceedings, vol. 1, pages 97 to 128 incl.

PUBLISHERS. North American Review for July, 1864.

QUEBEC LITERARY AND PHILOSOPHICAL SOCIETY. Transactions, New Series, vol. I, Nos. 1 and 2.

WILMINGTON (DEL.) INSTITUTE. Annual Report April, 1864, 8vo, pamph.

MONDAY, OCTOBER 10. Evening meeting.

The President, A. Huntington, in the chair.

Records of previous meeting read and donations to the Museum and Library were announced.

Letters were read from the following:

Chas. H. Lake, of Little Rock, Arkansas; J. A. Allen, of Springfield; W. H. Dall, of Marquette Co. Mich., relating to donations of specimens: J. H. Hickcox, of the New York State Library, Albany; S. J. Young, Librarian of Bowdoin College; Secretary of the American Philosophical Society, Philadelphia, relating to exchanges of publications: Prof. S. F. Baird; J. H. Thompson, of New Bedford; Sam'l Clarke, of Milwaukee, Wis., relating to the Naturalists' Directory: Miss Lucy Treadwell, of Salem; Miss A. L Coffin, of Newbury; J. E. Oliver, of Lynn; J. W. Young, of Worcester; S. Tenney, of Cambridge; James Lewis, of Mohawk, N. Y.; Rev. E. C. Bolles, of Portland, on business matters: A. L. Babcock, of Sherborn; Dr. A. S. Packard Jr., of Brunswick, Me.; Theo. Gill, of Washington; W. Hoxie, of Newburyport, relating to exchange of specimens.

Albert B. Russell, and Miss Lucy Treadwell, of Salem, and Theodore Attwill, of Lynn, having been nominated at a previous meeting were elected Resident Members.

Mr. Putnam communicated a paper from Mr. Alpheus Hyatt Jr., entitled "Remarks on the Polyzoa of New England" In this paper, which was referred to the committee on publication, Mr. Hyatt describes and figures several new species of *Cristatella* and *Plumatella* from Cambridge, Mass., and Norway, Me. For these species he proposes the names of *C. ophidioidea*, *P. hyalina* and *P. pennissewasseensis*. Mr. Hyatt also describes the anatomy of the genera *Cristatella* and *Pectinatella* and discusses their relations, as naked Polyzoa, to the remaining genera of the sub-order Lophopea.

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It was voted that meetings be held on the second and fourth Monday evenings of each month until otherwise ordered, and that all persons interested be invited to attend.

The President, from a committee appointed at the last meeting, reported that the Hon. C. W. UPHAM had consented to prepare a memoir of Mr. Ward, and was desirous of receiving any contribution that would aid in its preparation. After a few additional remarks, in which he stated that Mr. Ward was born at Salem, March 29, 1793, and died at Salem on Thursday evening, September 22, 1864, he submitted the following resolutions:

Resolved, that the members of this Institute received with deep and unaffected sorrow intelligence of the recent and very sudden death of our friend and associate, GEORGE ATKINSON WARD; and desire, by these proceedings, to express our high appreciation of his character and worth as a man and citizen, and our very great respect for his memory. As one of the original and prominent founders of the Essex Historical Society, in whose behalf he early enlisted with all his accustomed energy and enthusiasm, and to whose interests he was strongly committed, and as the last survivor of the founders of that institution, since merged in our body, it is especially fit and becoming, that we who have thus entered into these his early labors, should mark, with suitable testimonials of regard and respect, the event of his death, so sudden and startling to his friends and to this community, and so much deplored by us all. Descended from one of the most ancient and honored families of Salem, he was always ready and prepared, by his accurate and full knowledge of her annals from the earliest days of the Colony, to vindicate her character and good name; and whether at home or abroad, he was ever steadfast to the traditions, memories, and principles of the place of his birth. Endowed with the most genial qualities, with high executive ability, and with large practical and business capacities, he early sought a fitting sphere for their exercise and developement in the commercial metropolis of the country; and after walking in the high places of commercial life for more than

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thirty years, with varying fortunes and success, but always with honor and integrity, never too busy to foster and cultivate the studies aud tastes of his earlier life, or to engage in those works, which in all communities are required and expected at the hands of men of public spirit, and enlarged views, he came back here, but little less than one year ago, to a new generation—to die in his native and beloved town, and to be here gathered to his kindred and fathers. Although suffering from disease and infirmity he was still the same genial companionable and enthusiastic man as ever, in all good words and works, aud betook himself at once, with all the zeal of his youth, to the care, culture and growth of this child of his earlier days, as one of the departments and functions of the Institute. How he labored to extend its means and usefullness, and to enlarge its boundaries; and how he commended it to the regards, support and encouragement of our people we are all this day his witnesses. He had performed the same work on a larger scale, many years ago, for the Historical Society of New York, by presenting with great attractiveness, and in his fervent and glowing manner, its objects and labors to the culture and wealth of that city, thus greatly augmenting its means, and largely aiding it in entering on that career of usefulness and renown for which it has since been so much distinguished. The hand of our friend and associate was strongly in that earlier work of revival and reconstruction; and it was only in renewal of similar labors, years before, in the formation of the Essex Historical Society. It is an affecting incident, that his very last days and thoughts were employed in preparing illustrative memorials of the first meeting house of the First Church in Salem (and the first Congregational Church founded on the Western Continent,) the frame of which is now being reërected and covered for preservation on the grounds of the Salem Athenæum, in the rear of Plummer Hall, under the direction of a committee of the Institute, a work which he had undertaken, as a labor of love, and in which he was engaged at the very moment of the fatal attack.

Resolved, That a man of a character so strongly marked as that of our deceased friend, and who has so impressed

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himself in various ways and degrees of usefulness on his day and generation, deserves to be held in honored remembrance; and we are happy to have it reported to us this evening, that the work of preparing a fitting and just memorial of his life, and character, is entrusted to entirely competent hands, and that in due time, it will be ready for publication in our Historical Collections.

Resolved, That these Resolutions be entered at length on our records, in perpetual remembrance of the respect we bear for the memory of our deceased associate and friend, and of our grief at his death; and that an attested copy thereof be transmitted by the Secretary to the nearest relatives of Mr. Ward.

The acceptance of the resolutions was moved by Rev. G. D. Wildes and seconded by Prof. A. Crosby, and they were unanimously adopted.

MONDAY, OCTOBER 24. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Donations to the Library and Museum were announced.

Letters were read from—

Maine Historical Society, acknowledging the receipt of publications: Prof. S. F. Baird, of Washington, relating to the "Naturalist's Directory": H. L. Ordway, of Ipswich, on the habits of the Canker worm: Albert B. Russell and Theodore Atwill, of Lynn, accepting membership: Department of the Interior, Washington, giving notice of the transmission of books: A. L. Babcock, of Sherborn, relating to exchange of specimens: Dr. A. S. Packard Jr., of Brunswick, Me.; John W. Young, of Worcester; Miss Mary H. Coffin, of Newburyport; S. Lincoln, of Boston; S. J. Young, Librarian of Bowdoin College; Joseph Willard, of Boston; Wm. A. Smith, of Worcester, on business matters: James C. Ward, of Northampton, in reply to a communication containing the resolutions in memory of his father, the late G. A. Ward, Esq.

F. W. Putnam exhibited a skeleton of a Green Turtle, which had been prepared from a specimen lately presented by Francis Peabody, Esq., and explained the various parts of the skeleton, comparing it with that of a bird. He also spoke of the different sub-orders and families of Turtles as

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characterized by the skeleton, and exhibited a skeleton of the Chelys Matamata from the Amazon, which had been in the possession of the Institute for nearly thirty years, but had only recently been prepared for exhibition.

The Secretary presented, in the name of the Heirs of the late Perley Putnam, an autograph letter of General Lafayette, accepting the invitation to visit Salem in 1824, and made some remarks on the visit of Lafayette to this country in 1824—25.

The request of the "Picture Committee" of the National Sailor's Fair, for the loan of the portraits of John Rogers, Andrew LeMercier, Samuel Sewall, William Pinchon, Samuel Cooper, Benjamin Colman, Thomas Prince and Edward Holyoke, was referred to the Board of Directors.

WEDNESDAY, NOVEMBER 9. Stated meeting.

Vice President, A. C. Goodell Jr., in the chair.

F. W. Putnam proposed several amendments to the By-laws, which were adopted.

Solomon Lincoln Jr., of Salem, was elected a Resident Member. Edward S. Morse of Gorham, Me., and Edwin C. Bolles of Portland, Me., having been nominated by the Directors, were elected Corresponding members.

MONDAY, NOVEMBER 14. Evening meeting.

Vice President, A. C. Goodell Jr., in the chair.

Letters were read from the following:

Minnesota Historical Society, acknowledging the receipt of publications: Major Albert Ordway, 24th Mass. Infantry; Lt. John S. Allanson, 1st New York Engineers; Alex. Agassiz, of the Museum of Comp. Zoölogy; Alpheus Hyatt, of Cambridge, relating to the transmission of specimens: James C. Ward, of Northampton; E. M. Stone, of Providence, R. I., relating to the transmission of books: Prof. A. S. Packard, of Brunswick, Me.; J. S. Lewis, of Batavia, N. Y.; E. S. Morse, of Gorham, Me.; S. I. Smith, of Norway, Me., in relation to the publications.

F. W. Putnam read a communication from J. A. Allen of

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Springfield, entitled "Notes on the habits and distribution of the Duck Hawk, or American Peregrine Falcon, in its breeding season, and description of its eggs," which was referred to the Committee on Publications.

Mr. Putnam presented, in the name of Rev. E. C. Bolles, of Portland, a collection of land and fresh water shells from Maine and New York.

Mr Bolles, who was present by invitation, being called upon, remarked that he felt like little more than a beginner in this department of conchology. He had been attracted to the study by the examination of the lingual ribbons of the land mollusks, organs remarkable for their beauty and regular structure, and exhibiting under the microscope fine specific characters. As yet there are but a few American students of these shells. In general, people are ignorant of the riches scattered about them in every forest and on every hill side. A snail is *only a snail* to almost everybody, and the common belief is that there is only one species and that unworthy of a serious man's attention. In Maine from which most of these specimens were brought, there are fifty species of land and fifty-four of fresh water mollusks. Most of these are forms peculiar to N. America. One, the Achatina lubrica is a cosmopolite, the same in both hemispheres, on islands and on continents. Some are analogues of foreign shells,—not facsimiles, but built on the same general plan. A few were evidently imported—carried by the accidents of commerce, as vermin and weeds have been, to make the grand tour of the globe. The islands of the Maine coast were early colonized. Sometimes old coins and carved stones are discovered there. There is another proof of European visits. The common snails of England still retain their rights of squatter sovereignty upon the soil. These shells have never been found far inland. They testify like the weeds which follow the pioneer to the great tide of nature's migration.

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These specimens show us another great law of nature. Dissimilar as they are, all their differences lay in simple modifications of a simple type or plan. Beginning with Vitrina there is a loose transparent whorl of organized lime to protect the viscera of the mollusk. Through the flattened Helices to the turretted Achatina this whorl is twisted more or less closely, sculptured or plain, tinted or blanched, elevated or depressed, but in all cases reproducing the original plan in its structure. The animal exhibited the same fact. Animal and shell must be studied together. Here we begin to realize with what economy the Divine Wisdom worked. Out of a few simple substances and by touches of change almost microscopic in their minuteness the living vesture of the globe is made so various in its beauty and exhaustless in its forms.

The study of the anatomy of these mollusks is rendered somewhat difficult by the softness of their bodies. The most wonderful organ is the tongue or lingual membrane,—a rasp by which the creature secures its food. Each tooth of this rasp seems formed of the clearest glass. In some species there are over two thousand of these teeth upon the lingual organs. Under the microscope and especially by polarized light they form beautiful objects for examination. Mr. E. S. Morse, to whom the Natural History of Maine owes so much, has studied this matter scientifically and with fine results.

In short—Nature at our side everywhere offers us the choicest encouragement, whatever our particular tastes. The land repeats the wonders of the sea, and any association, like the Essex Institute, to study the lessons of both, is an association for mutual enjoyment, education and refinement in the knowledge of the great Creator.

The donations to the Library and Museum, received since the last meeting, were announced.

Charles Babbidge, of Salem, was elected a Resident Member.

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MONDAY, NOVEMBER 24. Evening meeting.
The President in the chair.

Letters were read from the following:

Rev. E. C. Bolles, of Portland, Me.; Solomon Lincoln Jr., and Charles Babbidge, accepting Membership: A. S. Peabody, of Cape Town, Africa; C. H. Jones, of Sun Prairie, Wisc., relating to the transmission of specimens: A. R. Burton, of Littleton, N. H.; William Muir, of Fox Creek, Mo., relating to exchanges: Rev. James Hubbert, of Toronto, C. W.: Prof. A. E. Verrill, of Cambridge; Charles W. Felt; Robert Hamlin, of Bennington, Vt., on business matters.

F. W. Putnam read letters from George C. Huntington, of Kelly's Island, Ohio, giving an account of the "Red bug" of that Island, specimens of which were presented to the Institute by Mr. Huntington. Mr. H. stated that the insect was, as far as he could learn, found only on Kelly's Island. It is called the "Red bug" on account of its bright crimson color when living. It is so minute as to be hardly visible to the naked eye, and from its habit of penetrating beneath the skin, at the elbow joint, under the arms and other tender places, is very annoying to persons of delicate skin, especially to women and children; of late years however, it has been discovered that alcohol applied to the part affected will kill the insect and allay the eruption caused by it. Whence this insect comes, or where it goes, is still a mystery. They do not propagate while under the skin. In many of its habits it is similar to the "Jigger" of the Southern States, and it is thought by most persons to be the same insect, but by its size and structure this is at once disproved. Mr Putnam thought that the insect was allied to the Louse *(Pediculus)* and, as far as he could ascertain, it was as yet undescribed.

William P. Upham presented in behalf of Mrs. Martha Lee late of Manchester, an old Journal kept by Benjamin Craft during the siege of Louisburg in 1745, with letters

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written by him at that time; also a Journal kept by Eleazer Craft in the Revolutionary war, at the period of the surrender of Burgoyne, which was presented by Mrs. A. H. Trask of Manchester.

After some remarks upon the subject by A. C. Goodell Jr., and Rev. G. D. Wildes, the communication was referred to the Committee for publication in the Historical Collections.

The Secretary presented in the name of S. H. Phillips, a portrait of President William H. Harrison, painted by Abel Nichols Jr., of Danvers, who visited North Bend on the Ohio, for this purpose, during the Presidential campaign of 1840.

The chair made some remarks upon the events connected with this campaign, and mentioned several incidents illustrative of the character of the late President.

Two very handsome and large specimens of sponge collected from the piers of Beverly bridge, in the channel of the river, at about ten feet below low water mark, were presented by Rev. A. B. Rich of Beverly, who stated that these specimens exhibited, in his opinion, the two extremes of the species, as he had other specimens in his collection from the same locality, having intermediate forms.

Mr Putnam spoke of the structure of sponges and the various opinions of Naturalists as to their proper affinities, some holding them to be plants and others the lowest form of animal life; to the latter opinion he was strongly inclined.

R. S. Rantoul stated that the War Department had caused surveys to be made for one or two new forts, within the limits of our County. One of these is at Beverly and is intended as a part of the defence of Salem Harbor; for this fort the name of "Hale" would be appropriate, in honor of Col. Robert Hale, a distinguished

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citizen of Beverly, in the last century; and if the other should be located in Ipswich, it might be designated "Fort Dennison," in respect to the memory of Col. John Dennison, formerly one of the most noted personages in that section of the county. On Mr. Rantoul's motion a committee, consisting of Messrs. Davis, Rich and Tuck, all of Beverly, was appointed to confer with other parties in relation to the naming of the proposed forts, should they be erected.

Mr. Rantoul called attention to the large number of valuable manuscripts that were daily sent to the paper mills, and trusted that all present would endeavor to rescue as many old papers as possible and have them placed on file at the Institute.

A. C. Goodell Jr., followed Mr. Rantoul, and hoped that all the friends of antiquarian research would endeavor to save the old manuscripts, books, papers, &c., especially those of the Ante-Revolutionary period, from the collectors of such articles for the paper manufactories.

G. D. Phippen mentioned that during the past season Mr. C. W. Felt had removed his establishment for the manufacture of the Type-setting and Justifying machine to this city. Much interest having been expressed in this machine, which bids fair to change the present mode of composition in the printing office, Mr. Phippen moved that a committee be appointed to invite Mr. Felt or his associates to give an account of the machine at some future meeting of the Institute; Messrs. Huntington, Phippen, Goodell and Kimball were appointed on said committee.

James Talant of Concord, N. H., and James Hubbert of Toronto, C. W., having been nominated by the Directors, were duly elected Corresponding Members.

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WEDNESDAY, DECEMBER 7. Special meeting.
The President in the chair.

The chair announced that the object of the meeting was to listen to an explanation of the Type-Setting, Justifying and Distributing Machine invented by C. W. Felt of this city, and now in the course of construction at the manufactory on Bridge street. After some general remarks appertaining to the subject, a general explanation of the machine, and of the purpose of its various parts, and their mode of operation was given by Mr. Wm. G. Choate, and a more detailed description of particular parts of the machine by Mr. John B. Richards, and remarks were made in regard to the invention by Mr. A. C. Goodell, Jr., and Mr. James Kimball.

This machine, as its name imports, sets and justifies type, and also distributes. The setting is done by the manipulation of a key board. There are thirty-seven keys for setting the type, one for each letter and character of some one alphabet, or size of type. While other keys touched with the keys of the several letters, turn the letters into any required alphabet, or size of type. Thus there is an italic key, and a capital key, which touched with the key of any letter, turn that letter into a capital or an italic, &c. The mechanism is so arranged as to keep pace with the most rapid compositor. Consequently if the manipulation of a key board is the quickest method of communicating motion intelligently to mechanism, as is believed, then this machine will enable a compositor to set types as fast as in the nature of things it can be done. Some idea may be formed of the rapidity with which the machine may be operated from the example of printing telegraphic machines which are operated by a similar key board. Rapid operators can compose on these at the rate of 7500 ems an hour, which is seven and a half times

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as fast as a rapid compositor can set types by the old method. By the use of a certain series of combined letters, cast in single type, which Mr. Felt has invented and which are used in the machine, there will be a further gain of about one-third, thus bringing the capacity of the machine nearly if not quite up to 10,000 ems an hour in the hands of a quick and skillful operator. Besides setting the type, this machine spaces and justifies the line, as well, or even better than can be done by hand and also leads the matter. The operation of justifying which printers have usually pronounced impossible for machinery to accomplish, and which no other type setting machine does or attempts to do, is performed by the machine automatically, all that the operator does, being to touch a key when his line is full, which transfers the line into the justifying apparatus and puts it in motion. Nor does the justification take the time of the operator. It is performed while he is setting the next line.

Attached to the machine is a register as it is called, which makes a complete record of all the operations of the machine by punching holes in a strip of paper. The use of the register is in rësetting and distributing the matter. These strips of paper being placed in the machine, and the machine set in motion, it will automatically set and justify the same matter in the same or a different type at any future time. This will obviate the necessity and save the expense of sterotyping books. The distribution is also automatically performed by means of the register, or it may be effected by the key board, or by nicks in the type.

Besides this machine Mr. Felt has invented several very simple and ingenious applications of the principles of the machine to setting type by hand which will be of great value, especially in small offices, where the large machines will not be required.

On motion of James Kimball it was *voted*—That the

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thanks of the Institute be presented to Messrs. Choate and Richards for their interesting and instructive remarks and explanations of the machine.

MONDAY, DECEMBER 12. Evening meeting.
The President in the chair

Letters were announced from:

New Hampshire Historical Society; Maine Historical Society; Massachusetts Historical Society, acknowledging the receipt of publications: A. L. Babcock, of Sherborn and A. B. Burton, of Bethleham, N. H., relating to exchange of specimens: Dr. Wm. Wood, President of the Portland Society of Natural History; Lt. J. S. Allanson, 1st New York Engineers; Prof. S. F. Baird, of the Smithsonian Institution, on business: Rev. Joseph Banvard, of the Worcester Society of Natural History; Rev. E. C. Bolles, of Portland, Me.; Prof. A. E. Verrill, of Norway, Me.; J. A. Allen, of Cambridge; W. H. Dall, of Chicago, Ill., relating to the publications.

F. W. Putnam read a letter from William Hoxie, of Newburyport, in which Mr. Hoxie stated that he had found the following birds breeding in Byfield Parish during the past season—*Scolecophagus ferrugineus* Sw. (Rusty Blackbird), *Myiodioctes canadensis* Aud. (Canada Fly-catcher) and *Antrostomus vociferus* Bonap. (Whip-poor-will).

George D. Wildes read a memoir of the late Captain William Nichols, of Newburyport, a noted Privateersman during the war of 1812 and one of the most enterprising and daring navigators of that period.

On motion of Mr. Goodell the thanks of the Institute were tendered to Mr. Wildes for his interesting communication, and a copy was requested for publication in the Historical Collections.

Mr. Putnam mentioned that in a collection of Reptiles received from J. A. Allen, of Springfield during the past season, there was a specimen of the *Celuta amœna* B. & G. (Worm Snake). Mr. Allen had for several years past been confident that he had seen this species near Spring-

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field, but had never been able to secure a specimen before. The only notice of this snake having been found in New England is by Dr. Storer who states, in his "Report on the Reptiles of Massachusetts," that a single specimen was collected by Professor Adams in Amherst, Massachusetts. Several authors having doubted the identification of Storer's specimen, the present one from Mr. Allen places the species beyond doubt in the Massachusetts fauna. Several specimens of *Heterodon platyrhinos* Latr. (Hog-nosed Snake, or Blowing Viper) were also in the collection received from Mr. Allen.

Mr. Putnam made some remarks upon the nest of a mouse found in a barberry bush, near Swampscott, and presented by Edward J. Porter.

A. C. Goodell Jr. mentioned that the course of Lectures on Insects, their habits and structure, by F. W. Putnam, would be delivered under the auspices of the Institute as soon as the necessary number of tickets were subscribed for.

Donations to the museum and library were announced.

W. P. Martin, W. R. Cloutman and E. S. Attwood, of Salem, were duly elected Resident Members.

MONDAY, DECEMBER 24. Evening meeting.

The President in the chair.

Letters were read from:

Messrs. Silliman & Dana, of New Haven, Conn.; T. A. Cheney, of Havana, N. Y., relating to an exchange of publications: Asst. Surgeon A. S. Packard, jr., 1st Maine Infantry; Alpheus Hyatt, jr., of Cambridge; James G. Arnold, Librarian, Worcester Nat. Hist. Soc., in relation to the publications: Edwin Harrison, of Irondale, Mo.; Albert G. Browne, Treasury Department, Beaufort, S. C., relating to the transmission of specimens; G. F. Matthew, of St John, N. B.; G. W. Tryon, jr., of Philadelphia, relating to the Naturalists' Directory: Prof. L. Agassiz, Director of Museum, Comp. Zoölogy; W. Barry, Sect'y Chicago Historical Society, acknowledging the receipt of publications: Rev. E. C. Bolles, of Portland, Me.; W. A. Nason, of Chicago, Ill.; W.

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H. Dall, of Chicago, Ill.; B. O. Peirce, of Beverly; R. Kennicott, Sect'y, Chicago Acad. Nat. Science; Dr. J. Bernard Gilpin, of Halifax, N. S.; W. A. Smith, of Worcester; N. Paine, of Worcester, on general business.

F. W. Putnam read a communication from D. M. Balch, "On Native Grapes." In this paper Mr. Balch gives the results of his analyses of the following varieties of grapes grown in this vicinity, viz: the Delaware, Hartford Prolific, Concord, Adirondac, Allen's Hybrid, Union Village, Clinton, Alvey (Hagar), Franklin, Rogers' Hybrids Nos. 1, 3, 4, 9, 15, 19, 22, 30, 33, and 41.

From these analyses, native grapes would seem to be divided into three classes: 1st, those in which the proportion of acid and sugar are well balanced, as the Delaware, Rogers' Nos. 4 and 15, Allen's Hybrid, &c.; these should make good wine. 2d, those in which the acid is deficient, as in the Adirondac, Hartford, &c. 3d, those in which the great excess of acid overpowers all else, and renders the fruit nearly uneatable; such are the Clinton, Franklin, &c. The paper also contained several important practical remarks upon the culture of the grape in our climate. On motion of Mr. Putnam the communication was referred to the Publication Committee.

Mr. Putnam stated that, since the last meeting, he had ascertained that Mr. Samuels, in his report on the Mammals of Mass., mentioned that the White-footed, or Deer Mouse, *Hesperomys leucopus*, builds its nest in bushes, and he therefore presumes that the nest presented at the last meeting by E. J. Porter, was that of this species of mouse. In reply to a question from the chair, Mr. Putnam gave a brief account of the winter nests of the Musk Rats.

Charles Davis, in behalf of the committee appointed at a previous meeting, submitted a report containing the recommendation of the Selectmen of Beverly, that the Fort which the Government proposed to erect in Beverly, be called Fort Hale, in memory of Col. Robert Hale, formerly of Beverly, which was adopted.

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Mr. Davis exhibited a fragment of the shell fired from the "Alabama" into the "Kearsarge," and which wounded three men on board the latter steamer; also the only piece of the "Alabama" remaining above water, and which was taken from the leg of one of the crew of the "Alabama" by Surgeon's Steward G. A. Tittle of the "Kearsarge," a citizen of Beverly.

Donations to the Library and Museum were announced.

James P. Kimball, of New York and Felipe Poey, of Havana, Cuba, having been nominated by the Directors were elected Corresponding Members.

Miss Susan T. Boynton, of Lynn and Henry W. Putnam, of Salem, were elected Resident Members.

Additions to the Museum and Library during October, November, and December, 1864.

TO THE NATURAL HISTORY DEPARTMENT.

BY DONATION.

ALLANSON, Lieut J. S., 1st. N. Y. Engineers. Lignite from the Dutch Gap Canal.

BARKER, GEORGE. Skin of a Coot from Lake Cupsuptic, Me.

BARRETT, ——— Miss, of South Danvers. Salamander, Hair Worms, and two Insects from South Danvers.

BOLLES, REV. EDWIN C., of Portland, Me. 44 specimens, 25 species of Insects and Spiders from Portland, Me., and Mohawk, N. Y. 43 species of New England Land and Fresh water Shells.

BROWN Jr., BENJ. 12 specimens, 11 species native Insects.

BROWN, DANIEL. Fresh specimen of Blue Heron, *Ardea herodias* Linn.

DALL, W. H., of Chicago. 9 specimens of Reptiles from the vicinity of Lake Goodwin, Marquette Co., Mich.

DAY, ALBERT. Specimen of Scorpion.

EMERTON, JAMES H. 87 specimens of native Insects.

EMMERTON, EPHRAIM. A Lizard enclosed in copal.

EMMERTON, W. H. Specimen of Sphinx taken in Salem.

HALE, HENRY. Specimen of Blue Sulphuret of Iron, from which metalic paint is made.

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HARRISON, EDWIN, of Irondale, Mo. Specimen of the Walking Fern, *Camptosarus rhizophyllus* from Irondale, Mo.

HASKELL, JOSHUA P., of Marblehead. Cases of Worms resembling the shells of helix from Wenham Pond. 46 species of native Shells.

HEATH, JOHN. A Birds' nest from Marlboro, Mass.

HORTON, N. A. A specimen of very thin veneer.

IVES, JOHN M. Fresh specimen of Bittern, *Botaurus lentiginosus*.

JILLSON, S., of Feltonville. Part of a skeleton of a Bald Eagle.

JONES, C. H., of Sun Prairie, Dane Co., Wisc. A collection of 130 Fishes from Madison 4th Lake, Wisc.

KIMBALL, ED. D. Crown Crane, *Balearica pavonina*, from W. Africa.

LAKE. CHAS. H., Mass Vols. A "Green Rose" from Little Rock, Ark.

LANDER, MISS E. R. Specimen of Lead from West Hampton, Mass.

LARRABEE, E. L. 4 specimens of the Silver-side, *Atherina notata* captured under Beverly Bridge.

LEFAVOR, JOSEPH. Fresh specimen of a Woodchuck found in Salem.

MALOON, WM. Hornets' nest.

MUSEUM OF COMPARTIVE ZOÖLOGY, Cambridge. 40 Specimens, 30 species of Fishes from Singapore, collected by Capt. W. H. A. Putnam.

NELSON, SYLVANUS, of Georgetown, Mass. Fossils from Rock river, N. Y.

NORRIS, CHAS. H. Mud Turtle, *Chelydra serpentina*, from Salem.

OSGOOD, CAPT. CHARLES. Eggs of Pyrula from Coast of Brazil.

OSGOOD, JOHN C. Specimen of Crystalized Salt from Atlantic Salt Company's Works, Bay City, Michigan.

PEABODY, A. S., of Cape Town, Africa. 2 specimens of *Callorhynchus antarctica* from South Africa.

PEABODY, FRANCIS. Green Turtle, *Chelonia mydas*.

PHIPPEN, G. D. 12 specimens, 4 species Insects from Salem.

PORTER, ED. J. Nest of the White-footed Mouse, *Hesperomys leucopus*, found in a barberry bush in Swampscott.

PUTNAM, CHAS. A. 6 specimens of Frost Fish *Morrhua pruinosa*, from North River. 30 specimens of *Unio complanatus* from Spring Pond.

PUTNAM. F. W. Eggs of the Sheldrake, Merganser, and Black Duck, from Oxford Co., Me.

RICH, REV. A. B., of Beverly. Two large and handsome specimens of Sponge from the piers of Beverly Bridge.

SAFFORD, JOSHUA. Ore from the Hecksher Coal Mine.

SAMUELS, E. A., of Boston. Egg of Fish Hawk, *Pandion carolinensis* Bonap., from Maine.

SANBORN, FRANCIS G., of Boston. 227 specimens, 69 species of Spiders collected in Massachusetts.

SHUTE, JAMES G., of Woburn. 73 specimens, 14 species of Insects from Newbern, N. C.

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TODD, MRS. JOHN E. A. Native Silver from Copiapo, Chilli.

TRACY, C. M., of Lynn. 2 specimens of *Desmocerus palliatus*, male and female. Butcher Bird, *Collyrio borealis*, from Lynn.

WHEATLAND, HENRY. Skull of a Musk Deer. Collection of Flower seeds from California.

WHEATLAND, CAPT. RICHARD. Specimen of Tobacco grown in Salem.

BY EXCHANGE.

BABCOCK, AMORY L., of Sherborn, Mass. 45 Skulls, mostly of native birds. Part of skeleton of a Cannibal fish from Surinam. Several Minerals from Kansas. Insects and Spiders from Sherborn.

PACKARD JR., DR. A. S., Brunswick, Me. Skulls of Seal, Esquimaux Dog, Black Bear and Squirrel, 13 specimens, 8 species of Fishes, 1 Frog, 16 species of Crustaceans, 200 specimens, 60 species Fossil Shells from the drift, 15 specimens, 3 species dried Echinoderms, from Labrador.

TO THE HISTORICAL DEPARTMENT.

BY DONATION.

ALLANSON, LT. J. S., 1st N. Y. Engineers, Bermuda Hundreds. Fossil Wood from Dutch Gap Canal.

ANDREWS, WM. P. A piece of one of the timbers of the oldest house in America, St. Augustine, Fla. Shells from Fort Wagner.

BLACK, ENSIGN NATH. W., of the gunboat "Mahaska." Rebel Torpedo from St. John's River, near Jacksonville, Fla.

BOLLES, REV. EDWIN C., of Portland, Me. Rebel Envelopes. Several Postage Stamps, Foreign and American.

BROOKS, HENRY M. 7 City Checks for 5—25 cents from N. Y. & N. J.

BROWNE, ALBERT G., of Beaufort, S. C. Lime blocks from the oldest house in America, St. Augustin, Fla.

CLOUTMAN, WM. R. A Pike taken from the Chinese rebels by Gen. Ward. Japanese Custom House Receipt. Chinese Coin. East Indian Copper Coin.

DAMON, ———, of Marshfield, Mass. Piece of Shell from the "Tennessee". Piece of Wood from the stern post of the "Brooklyn."

DAVIS, CHAS., of Beverly. Photographs of the new Chapel of the Baptist Society in Beverly and of the first Pastor of the society.

EMERTON, J. H. Cincinnati Token. Chinese Cash.

EMILIO, CAPT. LOUIS. Several Fuses of different kinds.

FRY, ———. Two Spindles from the railing on the top of a pew in the old East Church, built in 1718.

MILLER, FRED. L., Ass't. Eng. U. S. S. Kearsarge. A piece of the shell fired by the "Alabama," and which wounded three men on board the "Kearsarge."

ORDWAY, MAJOR ALBERT, 24th Mass., Infantry. 245 Foreign and American Coins.

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PERKINS, GEO. Spoon made of bone by an American prisoner confined in Dartmoor prison during the war of 1812.

PHILLIPS, S. H. Portrait of W. H. Harrison, painted by Abel Nichols of Danvers.

PUTNAM, CAPT. W. H. A. Native Sword from Java.

ROPES, NATH., of Cincinnati, Ohio. 250 specimens, 108 kinds of Western Tokens.

ROPES, TIMOTHY. Image from ancient Thebes.

SMITH, WARREN A. Confederate 10 cts. Postage Stamp.

STONE, REV. EDWIN M., of Providence, R. I. A portion of the Cotton from the bale on which David Crowley of Providence floated and was saved from the burning "Lexington" Jan. 13, 1840.

TREADWELL. CAPT. W. A., 14th N. Y. Artillery. Confederate Pass taken from the body of Lt. J. B. Gayle, C. S. A., killed at Spottsylvania, C. H., May 14, 1864. Spur from the boot of a rebel killed at Bull Run.

WHEATLAND, H. Two antique Powder Horns.

TO THE LIBRARY.

BY DONATION.

BRIGGS, WILLIAM. Dedication of Forest Dale Cemetery, pamph. 8vo, Holyoke, 1862. 2d An. Rep. of New England Freedman's Aid Society, pamph. 8vo, Boston, 1864.

BROOKS, HENRY M. Roscobel, or the compleat history of the most miraculous preservation of Charles II., 1 vol., 12mo, London, 1725. An. Rep. of Adj. Gen. of Mass., pamph. 8vo, Boston, 1862. Ash's Grammatical Institutes, 1 vol., 16mo, Worcester, 1785. Boston Almanac 1861, 1 vol., 16mo. Brownlow's Knoxville Whig, several numbers. The Hive, vol. 1, 16mo, Salem, 1828—9. 22 Pamphlets.

CHASE, GEORGE C. Friend's Review, 20 Nos., Philadelphia, 1864.

DAVIS, CHARLES, of Beverly. The Alabama and the Kearsarge by F. M. Edge, 8vo, pamph., London, 1864.

DROWNE, CHARLES, of Troy, N. Y. Annual Register of the Rennselaer Polytechnic Institute, 1864–5, 1st term, 8vo, pamph., Troy, 1864.

FARNUM, JOSEPH. The Brunonian, edited by Students of Brown University, 1 vol., 8vo, Providence, 1831.

GILPIN, J. B., of Halifax, N. S. Bernard's Lecture on the Sable, Darby's wreck of the Arno, &c., 12mo, Halifax. 1858. Transactions of the Nova Scotian Institute of Natural Science, vol. I, pt. 1, and vol., II, pt. 1, 8vo, Halifax, 1863–4.

GREEN, SAMUEL A., of Boston. Radicalism in Religion, Philosophy and Social life, four papers from Boston Courier, 1 vol., 12mo, Boston, 1855. Catalogue of Lawrence Academy, Groton, 8vo, pamph., 1864.

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Correspondence between Webster and Hulseman, 8vo, pamph., London, 1851. 71 Pamphlets.

Ives, Henry P. Trial of the Murderers of Mr. White, 8vo, pamph., Salem, 1830.

Kilby, William H., of Eastport, Me. Annual Report Adj. Gen. of Maine, for 1863, 8vo, 1 vol., Augusta, 1863.

King, Henry F. Hayden's Science and Revelation, 1 vol., 12mo, Boston, 1852. Barrett, the Golden Reed, 1 vol., 12mo, New York, 1855. Wilkinson on War, Cholera, and the Ministry of Health, 1 vol., 8vo, Boston, 1855. A Portrait of Swedenborg, &c., 8vo, pamph., Boston, 1854.

King, Miss Sarah, of Danvers. Tull's Husbandry, 1 vol., 8vo, London, 1750. The Gentleman's Jockey, 1 vol., 8vo, London, 1683. Bulkeley and Cummin's voyage to the South Seas, 1 vol., 12mo, London, 1757. Alingham's Geometry, 1 vol., 12mo, London, 1714. United States Register for 1795, 1 vol., 16mo, Philadelphia, 1794. Salem Gazette for 1799, 1801, 1802, 3 vols., fol.

Langworthy, I. P., of Boston. 43d, 48th, 49th, An. Rep. of American Tract Society, 8vo, pamph., Boston. American and Foreign Christian Union 32 Nos, and 64 Nos of the Christian World.

Lord, N. J. Files of the Boston Daily Post for June, July, August and September, 1864.

Massachusetts—Sect'y of State. Massachusetts Public Documents for 1863, 4 vols., 8vo. Report of Ship Canal, 1864, 1 vol., 8vo. 21st Registration Report of Mass., 1 vol., 8vo. Adj. Gen. Report, Mass., 1863, 1 vol., 8vo.

Nichols, John H. Several papers printed at Charleston, S. C., during the year 1864.

Odell, Charles. Collection of Almanacs.

Salem, City. 277 Pamphlets,—principally Town Reports.

Sibley, John L., of Cambridge. Catalogue of Harvard University, 1864–5, 12 mo, pamphlet.

Smith, Mrs., Nath'l., of Pembroke. Perin's Meditations, 1 vol., 16mo, Boston, 1709.

Sparks, Jared, of Cambridge. Life of John Ledyard, by J. Sparks, 1 vol., 12mo, Boston, 1864.

Stickney, M. A. 40 Pamphlets. Introduction to Latin Grammar, 1 vol., 12mo. Exeter, 1794.

Story, Augustus. Herald of Freedom, Railway Times and The Independent, files for several years. 24 Pamphlets.

Tucker, Jonathan. A collection of Manuscripts from the estate of the late G. Tucker.

Upton, James. Littell's Living Age, vols., 24, 25, and 26, 3d series, 8vo, Boston, 1864.

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UNITED STATES—DEPARTMENT OF THE INTERIOR. Reports of the Pacific Railroad, vols. X and XI. 4to. Japan Expedition Report, vols. II and III. 4to.

VALENTINE, B. E. Catalogue of Haverford College, 1864–5, pamph., 12mo, Philadelphia.

WARD, CHARLES. Journal of Commerce Jr., files for July, August, September and October, 1864.

WARD, JAMES C., of Northampton. The Journal and Letters of Samuel Curwen, edited by George A. Ward, 4th ed., 1 vol., 8vo, Boston, 1864.

WILDES, JAMES H., of San Francisco, Cal. Maps of the Public Surveys of California and Nevada, 1863.

BY EXCHANGE.

ALBANY INSTITUTE. Transactions, vol. IV, 8vo, Albany, 1858–64. Transactions of the Society for the Promotion of the Useful Arts, vol. IV, pt. II, 8vo, Albany, 1819.

AMERICAN ACADEMY OF ARTS AND SCIENCES. Proceedings, vol. VI, pages 97 to 340 inclusive.

AMERICAN GEOGRAPHICAL AND STATISTICAL SOCIETY. Proceedings, vol. II, Nos. 3 and 4, 8vo, pamph., New York, 1864.

CANADIAN INSTITUTE. The Canadian Journal for Sept. and Nov. 1864.

DARTMOUTH COLLEGE LIBRARY. Catalogue of Dartmouth College, 1864–5, 8vo, pamph.

EDITORS. The American, Vol. I, No. 1, December, 1864, Salem.
Essex Banner, Haverhill, Mass.
Florida Union, Jacksonville, Fla.
Haverhill (Mass.) Gazette.
Historical Magazine, New York.
Lawrence (Mass.) American.
Lynn Weekly Reporter.
Salem Observer.
South Danvers Wizard.
The Palmetto Herald, Port Royal, S. C.
The Reader, London, England.
Tuolumne Courier, Columbia, Tuolumne Co., California.

GILMAN, D. C., Librarian of Yale College. Catalogue of Yale College, 1864–5, 8vo, pamph., New Haven, 1864.

HARVARD COLLEGE LIBRARY. 130 Pamphlets, principally relating to the various New England colleges.

HARVARD COLLEGE OBSERVATORY. Safford on the Right Ascension of the Pole Star, 8vo, pamph., Cambridge, 1864.

IOWA STATE HISTORICAL SOCIETY. Annals of Iowa for October, 1864, 8vo, pamph.

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MASSACHUSETTS HISTORICAL SOCIETY. Proceedings, 1863–4, 1 vol., 8vo, Boston, 1864.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY. Scope and Plan of the School of Industrial Science, 8vo, pamph., Boston, 1864.

MISSOURI STATE HORTICULTURAL SOCIETY. Proceedings at Ann, Meeting, January, 1864, 8vo, pamph. Proceedings of Missouri Fruit Growers' Association, for 1859, 8vo, pamph.

MONTREAL SOCIETY OF NATURAL HISTORY. The Canadian Naturalist and Geologist for October, 1864.

NEW HAMPSHIRE HISTORICAL SOCIETY. Collections, vol. VII, 8vo, Concord, 1863.

PHILADELPHIA ACADEMY OF NATURAL SCIENCE. Proceedings, Sept. and October, 1864, 8vo, pamph.

PORTLAND SOCIETY OF NATURAL HISTORY. Journal Vol. I, No. 1, 8vo, pamph. Proceedings, Vol, I, pages 97 to 128 inclusive.

PROVIDENCE ATHENÆUM. 29th Ann. Report, Sept. 1864, 8vo, pamph.

PUBLISHERS. North American Review, Oct. 1864.

RHODE ISLAND HISTORICAL SOCIETY. One hundred and fifty pamphlets.

YOUNG, STEPHEN J., Librarian of Bowdoin College. 10th Ann. Rep. of the Schools in Maine, 8vo, pamph. Ann. Rep. of Adj. Gen. of Maine, for years ending Dec. 1861, and Dec. 1863, 2 vols., 8vo. The Bowdoin Bugle, No. XIII, Nov. 1864. 12 Pamphlets relating to Bowdoin College.

ZOÖLOGISCHE GESELLSCHAFT, FRANKFURT, A. M. Der Zoölogische Garten, Vol. V, Nos. 2, 3, 4, 5, 6.

BY PURCHASE.

Draper's History of Spencer, 1 vol., 8vo, Worcester, 1860. Lincoln's History of Worcester with Hersey's Continuation, 1 vol. 8vo, Worcester, 1862. Meade's Old Churches, Ministers and Families of Virginia, 2 vols. 8vo, Philadelphia, 1857. Sewall's Ancient Dominions of Me., 1 vol. 8vo, Bath, 1859. Moore's Lives of the Governors of New Plymouth and Massachusetts Bay, 1 vol., 8vo, Boston, 1851. Thayer's Family Memorial, parts 1 and 2, 1 vol., Hingham, 1835. Plumer's Life of William Plumer, 1 vol., 8vo, Boston, 1857. Adams, John, The Works of, with a Life of the author, Notes, &c., by C. F. Adams, 10 vols. 8vo, Boston, 1850–6. Vallandigham, C. L., The Trial by a Military Commission, 1 vol., 8vo, Cincinnati, 1863. Field's Centennial Address and Historical Sketches, 1 vol., 12mo, Middletown, 1853. Millet's History of the Baptists in Maine, 1 vol. 12mo, Portland, 1845, Westcott's Life of John Fitch, 1 vol., 12mo. Philadelphia, 1857. Brick Church Memorial, 1 vol. 8vo, New York, 1861. Woodworth's Reminiscences of Troy from its Settlement in 1790 to 1807, 8vo, 1 vol., Albany, 1860. Barne's Settlement and Early History of Albany, 1 vol. 8vo, Albany, 1864. Humphrey's Life of Putnam, 1 vol., 12mo, Hartford, 1850. Hopkins, The Patriot's Manual, 1 vol. 12mo, Utica, 1828.

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MONDAY, JANUARY 9. Regular meeting.

Vice President Goodell in the chair.

Letters were read from:

E. S. Atwood of Salem; James S. Tallant of Concord, N. H., accepting membership: J. W. Young of Worcester, relating to the publications: L. C. Draper, Sec'y Wisconsin Historical Society; E. T. Cresson, Sec'y, Entomological Society of Philadelphia; W. H. Dall of Chicago, Ill.; J. E. Arnold, Libr., Worcester Society of Natural History; W. C. H. Waddell of the American Geogr. and Statistical Society; B. Westermann, & Co.; James E. Oliver of Lynn; Waldo Higginson of Boston, on Business.

F. W. Putnam exhibited several colored drawings by Dr. J. Bernard Gilpin of Halifax, N. S.

One of these was a winter scene, representing a moose feeding on the tender twigs of a young tree which it had pushed over for the purpose, by straddling the tree with its fore legs, bearing on it with its chest. Another drawing was probably that of an undescribed species of Trout from Nova Scotia. The remaining were figures of the "Nurse" or "Sleeper Shark," *Somniosus brevipinna* Le Su., taken from a specimen captured in seventy fathoms of water on Sambro Banks, and brought to Halifax in the winter of 1862-3. The specimen was eleven feet three inches in length. In the manuscript accompanying the drawings, Dr. Gilpin describes the stomach, small and large intestines of this shark as being formed of one large simple gut from the mouth to the anus, with hardly perceptible differences in the various parts. He also mentions that there was a single cœcal appendage. This shark is said to inhabit deep water, never appearing on the surface, and its habits are so sluggish as to allow of its being often captured with a cod line. The fishermen speak of it as voracious, and, at some seasons, troublesome about their nets. Dr. Gilpin also remarks upon the inaccuracy of the published figures, of this species, by Le Sueur, DeKay and Yarrell.

Mr. Putnam spoke of the importance and great value of such figures and observations as those made by Dr. Gilpin, and called attention to the articles on the habits of the

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Herring by Dr. Gilpin. published in the Transactions of the Nova Scotian Institute of Natural Science.

Rev. G. D. Wildes presented, in the name of Mrs. John Forrester, a Chinese visiting card of the late D. Fletcher Webster Esq., used while Secretary of the American Embassy at China. Also a Hindostanee Poem, written on Palm leaves and supposed to be five hundred years old.

Donations to the Library and Museum were announced.

Daniel H. Mansfield, Charles Odell, and Charles B. Fowler, of Salem, were elected Resident Members.

MONDAY, JANUARY 23. Regular meeting.

The President in the chair.

Letters were read from:

E. S. Morse of Gorham, Me., accepting Membership; Hiram A. Cutting of Lunenberg, Vt.; William Wood & Co. of New York; A. Mather of Philadelphia, in relation to the publications: J. A. Allen of Cambridge; R. Kennicott, Curator, Chicago Acad. of Sciences; E. T. Cresson, Sec'y, Entomological Society of Philadelphia; C. W. Felt; C. P. Preston of Danvers; Wm. Prescott of Concord, N. H., on business.

Rev. G. D. Wildes presented, in the name of Elijah Haskell, an old Spanish spear head and a gun lock, which were found in the Castle of San Juan d' Ulloa, Mexico; also the eggs of Pyrula from the Delaware Breakwater.

Donations to the Library and Museum were announced.

The President, after some appropriate remarks on the life, character and public services of the late Edward Everett, submitted the following resolutions:

Resolved. That we desire to express, and to place upon our records, in perpetual remembrance, our profound admiration and respect for the life and character of the HONORABLE EDWARD EVERETT, a Corresponding Member of the Essex Institute, and to join in the tributes, everywhere so justly and in such large measure paid to his memory, his worth, and his deeds, as the great American Scholar, Orator, Statesman and Patriot, and our most illustrious citizen.

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A. letter from the Hon. C. W. Upham, was read by the President as follows:

Salem, Jan. 23, 1865.

Hon. Asahel Huntington,
President of the Essex Institute.

DEAR SIR:

It is eminently proper for every literary and scientific association to participate in the honors paid to the memory of EDWARD EVERETT. I regret not to be able to be present at the meeting this evening.

An uninterrupted friendship, covering a period of more than forty years, frequent and long continued correspondence, and much personal intimacy, have given me opportunity to judge of his character. I can say, with the strictest truth, that every word of encomium in the various forms in which the universal public sentiment has been expressed on the occasion of his death, finds full support in my impressions and recollections. In the combination of his natural endowments, the circumstances of his education and history, and the uses to which he put his great faculties and advantages, he has always appeared to me without a parallel.

The warmth and tenderness of his heart, his devotion to offices of benevolence, and his calm moral courage, are the traits which ever most arrested my attention. He often encountered vehement hostility, and the tide of popular misunderstanding and misrepresentation sometimes threatened to overwhelm him, but he kept on his way patiently and quietly, never yielded to its power, or veered from the course marked out by his convictions of duty.

He has been the great teacher of his countrymen of two generations, constantly pouring forth from his wonderful resources of knowledge and genius, the most useful information and the noblest sentiments. An elevating influence has pervaded all the productions of his pen, and inspired his eloquence. He has pushed forward the intelligence, and stimulated the progress of society steadily for more than half a century. If his unrecorded acts of courtesy, kindness, and usefulness in the daily routine,

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and ordinary course of life should be made known by those who have experienced them, they would equal in amount the extraordinary accumulation of his public labors. No one, however humble, ever addressed him for information without receiving a prompt and considerate reply, no one ever sought his aid without receiving evidence of his kind endeavor to serve him. He was faithful, punctual, and true to every opportunity of usefulness.

The collection of his Orations and Addresses, when completed, will be found to possess the elements of value and interest that will secure for them a permanent place in the highest department of the literature of the language. They embrace a wider circle of knowledge and a greater variety of subjects, in a style of elegance, accuracy, and polish, than any other work, and will stand the test of time.

His career justifies, and his classic grace and dignity of countenance and mien would peculiarly adorn the most costly monument that a grateful people can rear. All coming generations ought to be enabled to behold the features and form of the American, who has wrought out, by a life of industry, duty and virtue, the most finished model of culture and civilization.

If a portion of the contribution, which wealth and patriotism are about to make to this object, could be expended in giving to the public, in a beautiful form, and at a cost within the means of the great body of the people, a full collection of his productions, of all kinds,—from his first academic efforts to his last expiring strains, pleading the cause of country and Christian charity in Faneuil Hall,—it would indeed be the grandest monument, and render his usefulness perpetual.

Yours, very truly,

CHARLES W. UPHAM.

Resolved. That the letter of Mr. Upham be entered at length upon the records, and that we cordially concur in its sentiments and estimation of the life and character of Mr. Everett.

Resolved. That an attested copy of these proceedings

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be transmitted by the Secretary, to the family of Mr. Everett.

Rev. G. D. Wildes seconded the resolutions with appropriate remarks, and they were unanimously adopted.

Francis C. Webster of Salem, was elected a Resident Member.

MONDAY, FEBRUARY 6. Regular meeting.

Vice President Goodell in the chair.

Letters were read from:

Massachusetts Historical Society; Natural History Society of New Brunswick; Nova Scotian Institute of Natural Science; Corporation of Brown University, acknowledging receipt of publications: Prof. A. E. Verrill of New Haven, Ct.; W. H. Dall, of Chicago, Ill.; Thomas R. Drowne; James L. Oliver of Lynn; C. W. Felt; J. Colburn of Boston; S. D. Bell of Manchester, N. H., on business: J. A. Allen of Cambridge; Trübner & Co. of London, relating to the publications: W. W. Stuart of the Buffalo Society of Natural Sciences, on the exchange of specimens: Rev. E. C. Bolles of Portland, Me., transmitting specimens: Prof. Theo. Gill, Librarian of the Smithsonian Institution, giving the particulars of the destruction by fire of a portion of the Smithsonian Institution: Franklin B. Hough of Albany, N. Y.; Prof. D. C. Eaton of Yale College, relating to the Naturalists' Directory: William Endicott of Shanghae, China, accepting Membership: Mrs. Mary H. Nichols, presenting a portrait of her late husband, Dr. Andrew Nichols: William Everett of Boston, in reply to a communication containing the resolutions passed at the last meeting of the Institute in memory of his father.

Dr. H. Wheatland gave a brief account of the life and services of Dr. A. Nichols, who was one of the pioneers in the study of Natural History, in this vicinity; following immediately in the steps of the celebrated Rev. Dr. Cutler of Hamilton. His example and precept have done much for the promotion of those objects which we now possess and enjoy. He was active in the organization of the Essex County Natural History Society, and for the first twelve years its President. It is well, occasionally, to look back upon the days of our infancy, and call to

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mind those who have laid the ground work of the operations of the present day.

Messrs. J. M. Ives and F. W. Putnam, alluded to the various discoveries made by Dr. Nichols in local Natural History.

F. W. Putnam announced the donation of one hundred and thirty-five copies of "The Victoria Regia, or the Great Water Lily of America, by John Fisk Allen," from the author. This work was published in 1854. It is a folio, and contains sixteen pages of text, and six plates representing the flower of natural size, in several stages of its growth, the structure of the leaf, and the young plant. The Institute, is, by this donation, in possession of all the remaining copies of the edition, and the only source whence the work can be obtained. On motion of Mr. Putnam, it was

Voted. That the copies of the "Victoria Regia," donated by Mr. Allen, be sold at a price not less than ten dollars per copy, or exchanged for works, equal in value, on Natural History and Horticulture, and that all monies received from this source be expended in the purchase of works on Natural History and Horticulture; and that all books received as above be placed in the Library of the Institute as donations from Mr. Allen.

Donations to the Library and Cabinets were announced.

Albert J. Lowd, Thomas R. Drowne and Benjamin Pearson, of Salem, were elected Resident Members. Winslow Lewis of Boston, was elected a Corresponding Member.

MONDAY, FEBRUARY 8. Quarterly meeting.

Vice President Goodell in the chair.

The following amendments to the By-Laws were adopted.

CHAPTER I. The following to be added: "Provided, however, that any member may, in lieu of the annual assessment, pay the sum of thirty dollars to be added to

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the funds of the Institute, the annual interest thereof to be considered as the payment of the annual assessment of said member."

CHAPTER IV. Lines 4th, 5th, 6th and 7th to be changed so as to read; "No specimen shall be taken from the rooms except by permission of the Committee of the Department to which it belongs, upon a written application made to the Secretary or Superintendent."

Amos Noyes of Newburyport, John Kinsman, Frederick Lamson of Salem, were elected Resident Members. James C. Ward of Northampton, was elected a Corresponding Member.

MONDAY, FEBRUARY 20. Regular meeting.

Vice President Goodell in the chair.

Letters were read from:

Prof. F. Poey of Havana; Messrs. Trübner & Co. of London; Prof. A. E. Verrill of Yale College; J. A. Allen of Cambridge, relating to the publications: R. Kennicott, Curator, Chicago Acad. Nat. Science; Lt. Col. Ordway, Bermuda Hundred, Va.; A. L. Babcock of Sherborn, notice of the transmission of specimens: Prof. Poey of Havana; Dr. Winslow Lewis of Boston; F. C. Webster, accepting membership: Lyceum of Natural History of New York; Mass. Historical Society; Boston Society of Natural History, acknowledging the receipt of publications: New York Chamber of Commerce, giving notice of the transmission of books: N. Bouton of Concord, N. H., in reply to questions respecting the Records of the Conventions, at Exeter, 1774—'75. Dr. S. A. Green of Boston, J. S. Appleton of Boston, on business: H. G. Jones, Corresp. Sec't. Penn. Historical Society, relating to the exchange of publications of the State of Pennsylvania.

Mr. Putnam read a communication from J. A. Allen, entitled, "Notice of a Foray of a colony of *Formica sanguinea* Latr, upon a colony of a *black species of Formica* for the purpose of making slaves of the latter." Referred to the Publication Committee.

F. W. Putnam made a few remarks upon the development of the fins of fishes, and the subsequent absorption of certain fins in some species.

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He had lately examined young specimens of *Achirus lineatus* Cuv., and had discovered that they possessed *pectoral* fins, which were situated very near the opercular openings and composed of four well developed rays. In two specimens, which were nearly three inches in length, the pectorals were perfectly developed, except on the left side of one specimen where no fin could be traced. In another specimen, about four inches in length, both pectorals were present. A number of larger specimens were without pectoral fins which has been considered as the normal condition of the species of the genus Achirus.

Donations to the Library and Museum were announced.

Voted. That this meeting be adjourned to Tuesday evening next.

TUESDAY, FEBRUARY 28. Adjourned meeting.

Vice President Goodell in the chair.

Hon. C. W. Upham read an interesting memoir of our late esteemed member, GEORGE A. WARD.

On motion of Dr. Wheatland, it was

Voted. That the thanks of the Institute be tendered to Mr. Upham for the highly interesting and valuable memoir of the life, character and services of our late member, George A. Ward, and that a copy be placed at the disposal of the Publication Committee for publication in the "Historical Collections."

MONDAY, MARCH 6. Regular meeting.

Vice President Goodell in the chair.

Letters were read from:

The Department of the Interior, giving notice of the transmission of twenty-eight volumes of Public Documents: S. P. Fowler of Danversport; N. Brown of Boston, relating to the publications: Natural History Society of New Brunswick, acknowledging the receipt of publications: T. A. Cheney of Havana, N. Y., relating to an exchange of publications: Prof. James Hall of Albany, N. Y., offering to complete the Institute's set of the Reports on the New York State Cabinet: W. W. Burrage of Boston, relating to the printing of Reports of the Classes

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of Harvard University; H. W. Putnam, City Point, Va.; William L. Welch, notice of transmission of specimens and photographs: Messrs. Hartman & Laich of Cincinnati, Ohio, on business.

Captain N. E. Atwood of Provincetown, being present, was called upon by the chair and gave an interesting account of several species of native fishes as observed by him—

The Cod fish of the Eastern coast of the United States is not an inhabitant of the waters south of Cape Hatteras; that cape being the southern limit of the species. The northern limit he could not state, though it was certainly far north of the Straits of Belle Isle. In regard to the Cod, on our eastern coast, being of one, two, or three species, he could not, as yet, decide, but judging from their habits alone there might be three species, and it was his greatest desire to devote the rest of his life to the solving of this and similar problems in ichthyology, which can only be done by a person spending a length of time at each of the fishing grounds on the coast; carefully collecting facts, examining and comparing a large number of specimens from each place. At present, all he could say was, that there was a great and constant variation in the habits and size of the Cod from the various fishing grounds on the coast. The Cod taken by troll lines in the Gulf of the St. Lawrence are much larger than those from any other place, while those taken by the hand lines are quite small. The largest Cod he had ever seen weighed one hundred and one-half pounds, and this specimen was taken near Provincetown. He had heard of others that were supposed to have weighed from one hundred and fifty to one hundred and seventy-five pounds, which had been captured in the Gulf of St. Lawrence near the shore. On the coast of Labrador, he had never seen a Cod that would weigh twenty-five pounds; larger specimens, however, were taken on the small banks in the Straits of Belle Isle, five miles and upwards from the shore, and on George's Bank the fish caught with hand lines average larger than from other localities.

Mackerel come into Provincetown harbor in the spring as early as the 15th of May, all of full size and with spawn,

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and are then known as large No. 3's. By the 28th of May the spawn is fully developed, and deposited by the first of June. About the first of July young Mackerel, not more than two and one-half inches in length, are abundant in the Bay. These young Mackerel, in the latter part of October, are about six inches in length, and he has caught and packed and sold them as "No. 4 Mackerel." They leave the coast earlier in Autumn than the older ones. The large Mackerel, which appear first, as before stated, are followed by the arrival of small ones, on our coast north of Cape Cod about the 15th of June. These are known in the market as "Blinks," and are from last year's eggs. "Tinkers," are of two years growth; "Half-Size," are three years old, those older are called "Large ones." When Mackerel arrive on the coast, being lean, they are all designated as "No. 3's," but as they feed and improve in condition they are called "No. 2's," and when fat, are marked "No. 1," provided that they are thirteen inches long: but if less than thirteen and over eleven, then they are "No. 2's" if fat; all under eleven inches are marked as "small No. 3's," whether fat or poor. Adult Mackerel of four years, or more, are the only ones which spawn on our coast, and they will not take the hook until they have deposited their spawn, when they become lean and voracious. Formerly it was supposed that the large Mackerel, which first appear in Provincetown harbor, had passed the winter in the mud, and many persons would not eat them owing to their supposed muddy taste. These large Mackerel go further north than the smaller ones, returning southward long after the others have left the coast, and are even captured in November and December in the vicinity of Provincetown. Capt. A. was convinced that the *Scomber grex* was the young of the *S. vernalis*, Mitchill, and not a distinct species.

After giving an interesting account of the various modes of capturing the Mackerel at different times of the year, Capt. A. alluded to the Bluefish and the changes which had taken place in its habits. This fish, which many years ago, was very abundant, and held in high estimation by the Aborigines of our country, wholly disappeared from our coast in 1764, and not a specimen was

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seen on the coast, so far as Capt. Atwood knew, for fifty years. In 1847 they returned to the North of Cape Cod in great abundance, and have since been taken in large quantities in weirs and nets, and by the hook, near the shore. Now they avoid the shore, and, during the last year or two have kept in the Bay, where it is difficult to capture them, as they seldom take the hook, though, until recently, they were most voracious and game fish.

The Menhaden, which were formerly so great a pest to the fisherman, and considered only fit for manure, appear in vast numbers on the coast of Massachusetts during the summer, a little later than the Mackerel, and remain until late in the season. They are now a valuable source of income, being caught for the oil, which is pressed from them, and sold for $40 a barrel. The refuse, after the oil is extracted, is used as a fertilizer and commands a high price. The sides of these fish are also salted, packed in barrels, and sold at a good price for Mackerel bait. The Menhaden does not spawn while on our coast, and it is only in the few, which have been driven into the rivers and which do not leave the coast until December or January, that spawn has been found. In the month of August and September a few of the young Menhaden are seen in our harbors; but further south, along the coast of Virginia, the young are seen in countless millions, and in heavy storms are driven on shore and left to die. On the coast of Virginia, small Menhaden appear after the large ones have left for the North. From the fact that the Menhaden which visit us during the summer, are either of a large and uniform size, or quite young, this species is supposed to attain its growth in a single year.

On motion of Rev. Mr. Wildes, the thanks of the Institute were voted to Capt. Atwood, for his interesting remarks.

Donations to the Library and Cabinets were announced.

John Dixey, Joseph B. F. Osgood, and Edward H. Knight, of Salem, were elected Resident Members.

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MONDAY, MARCH 20. Regular meeting.
Vice President Goodell in the chair.

Letters were read from:

Lyceum of Natural History of New York, acknowledging the receipt of publications: Boston Society of Natural History, acknowledging the receipt of a collection of plants, collected in Zanzibar, by Caleb Cooke: Amos Noyes of Newburyport, accepting Membership.

Donations to the Library and Museum were announced.

A. C. Goodell Jr. read a paper entitled the "Cavalier and the Puritan." This will be published in a separate form.

John Daland of Salem, and Eben F. Stone of Newburyport were elected Resident Members.

Additions to the Museum and Library during January, February, and March, 1865.

TO THE NATURAL HISTORY DEPARTMENT.

BY DONATION.

ALLEN, FRANCIS R., Hamilton, Fresh specimen of Bald Eagle, *Haliætus leucocephalus*, shot in Hamilton, Jan. 20.

ALLEN, J. A., Cambridge. Specimens of a Red and of a Black species of Ant, and the pupa of the Black species; taken from an army of the Red species, Springfield, Mass., July 30, 1864.

BABBIDGE, CHAS. H. Chalcopyrite from Cheticamp, N. S.

BABCOCK, A. L., Sherborn, Mass. 9 specimens, 7 species, Insects; Skin of *Sciurus hudsonius*; skeletons and parts of skeletons of 3 species of native Birds; specimen of *Anodonta fluviatilis*, from Sherborn.

BUTTRICK, S. B. Portion of the jaw of a Porpoise. Water Beetle, *Dytiscus sp.*, from South Salem.

BOLLES, REV. E. C., Portland, Me. 7 specimens of *Anodonta edentula* Lea, *A. Ferussaciana* Lea, *Unio iris* Lea and *U. calceolus* Lea from Milwaukee, Wis. 3 specimens *Mya arenaria* from the Postpleiocene at Gardiner, Me. 3 specimens *Coleoptera* from Africa.

CARY, GEO. A. 2 specimens of *Tellena* from Turk's Island.

CHAMBERLAIN, JAMES A. 2 Holothurians, dry.

CHICAGO ACADEMY OF NATURAL SCIENCES, Chicago, Ill. Skins of 8 species of Mammals and 64 species of Birds from the West and North. 36 species, 51 specimens of Western Bird's eggs.

DAVIS, CHARLES, Beverly. Egg of an African Ostrich.

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HARRINGTON, AUGUSTUS, North Becket. Crystal and massive Emery, Iron ore and Margarite, from Chester, Hampden Co., Mass.

HASKELL, ELISHA. Eggs of *Pyrula* from Delaware Breakwater.

HATCH, CHAS. F. Flying fish, *Exocœtus sp.*, from off the mouth of the Amazon. Centipede from near Parahiba River, Brazil.

HEATH, JOHN. Larva of *Papilio Turnus* Linn. from Lynnfield.

HEATH, N. 5 Insects from Salem.

HIGBEE, CHAS. H. Malachite from Africa.

HOFFMAN, CAPT. CHAS. Lizard from Bissao, W. C. Africa.

KEZAR, WALTER A. Wood perforated by Teredo, from Pensacola, Fla.

KNEELAND, CYRUS A., Topsfield. Living specimen of the Saw-whet Owl, *Nyctale acadica*, captured in Topsfield.

LOVETT, EDMONDS. 3 species, 5 specimens of *Ophidians;* 3 species, 3 specimens of *Saurians;* 1 *Bird;* 6 species, 21 specimens of *Insects;* from the South West Coast of Africa.

LOWD, MARK. Fungus.

MACK, DR. WM. Larvæ of *Œstrus Bovis* from a cow.

NELSON, S. AUGUSTUS, Georgetown. Jasper from Winter Island.

NICHOLS, STEPHEN. Fungus.

ORDWAY, COL. ALBERT, 24th Mass. Inf't. Clay from "Dutch Gap Canal."

PALFRAY, CHAS. W. Specimen of the Mocking Bird, *Mimus polyglottus* Boie, 13 years old.

PATCH, W. H. H., Concord, N. H. Living Opossum, *Didelphys virginiana* Shaw, from Virginia.

PERKINS, EZRA, Essex. Nest of Humming bird, *Trochilus colubris* Linn.

POND, T. M., Framingham. Nest and eggs of the Meadow Lark, *Sternella magna* Swains, from Illinois.

PORTER, ED. J. Fossils and Minerals from Ohio. 10 Insects, 7 Crustaceans, from Essex Co. *Mantis sp.* from Washington.

PURDIE, H. A., Boston. Several Spiders from Boston.

PUTNAM, F. W. Cochineal Insects, *Coccus cacti*, from Mexico. Specimen of Sapphire. Several species of Fishes from Mass. Bay. Claw of Lobster (malformation.)

PUTNAM, H. W. Infusorial Earth and Marl from near City Point, Va.

QUIMBY, DR. E. H. Human embryo.

ROBERTS, J. W. Fresh specimen of the Great Gray Owl, *Syrnium cinereum* Aud., captured in North Salem.

SANBORN, F. G., Boston. Specimens of the Potter Wasp, *Eunemes fraterna*. Plum Weevil, *Rhynchænus Nenuphar;* Pine Weevil, *Curculio Pales*, from Mass.

SAUNDERS, MISS MARY. Living specimen of the Acadian Owl, *Nyctale acadica*, captured in South Salem on Jan. 19.

WHITE, GEO. M. 226 specimens, 75 species, Insects from Salem.

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TO THE HISTORICAL DEPARTMENT.

BY DONATION.

ALLEN, J. F. Waterproof Japanese Coat made of paper.

BOLLES, REV. E. C., Portland, Me. One of the first stamped Envelopes issued in England, May 5, 1840. Designed by G. W. Mulready, R. A.

BUTTRICK, S. B. The Cockade worn by the late High Sheriff, Joseph E Sprague. Indian Relics from Ware's Beach, Marblehead, collected by JOHN W. BARTLETT.

CHAMBERLAIN, JAMES. 4 Foreign Postage Stamps.

COGSWELL, BRIG. GEN'L. A series of Photographic Views taken in Atlanta, Ga.

EDWARDS, CHAS. W., Serg't 2d Mass. Inf't. Piece of the Rebel Flag found flying at Atlanta on the capture of the city.

FAIRFIELD, CAPT. JAMES. 3 Coins from Uruguay; 1 Coin from Buenos Ayres.

FELT, S. Q. Native Dress (Sarong) from Java. 5 Photographs of Sikhs and other castes of India.

FORRESTER, MRS. JOHN. Chinese Visiting Card of D. F. Fletcher.

GOODELL JR., A. C. Bill Head of John Hancock.

HASKELL, ELISHA. Gun Lock and an ancient Spanish Spear Head from the Castle of San Juan d'Ulloa, Mexico.

IVES, JOHN M. Wooden Images, carved by Alfred Bates, a soldier of the war of 1812.

KING, CAPT. H. F. Dutch Copper Coin (2 stivers.)

LOVETT, EDMONDS. Native Mat from the South West Coast of Africa.

PERKINS, EZRA, Essex. Indian Pipe.

PHIPPEN, NATH'L. $5 Bank Note of the United States Bank 1828.

PUTNAM, MRS. EBEN. Cane made from a timber used in the 2d and 3d house of the 1st Church.

RHODES, HENRY W. Rebel Uniform Button.

STEERS, JAMES L. Rebel Uniform Button.

SYMONDS, GEO. W. Piece of a Rebel Gunstock from the "Wilderness."

WILKINSON, MRS. ELIZABETH, Beverly. Irish Flax; such as was used in the manufacture of linen cambric. Brought from Ireland in 1791.

TO THE LIBRARY.

BY DONATION.

ALLEN, CHARLES A., Cambridgeport. 1st and 2d Triennial Reports of Class of 1858 of Harvard, pamph.

ALLEN, JOHN FISKE. Boston Cultivator for 1862, 1863, 1864, 3 vols., 4to, Boston. 135 copies of the Victoria Regia, folio.

BALLARD, DAVID, Brunswick, Me. Bourne's Address at the Popham Celebration, Aug. 29, 1864, pamph.

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Bolles, E. C., Portland, Me. Illustrations de Timbres Postes, J. B. Moens. 8vo, Liv. 1 to 9. Bruxelles, 1862.

Boston Public Library, Trustees of. 12th Annual Report, 1864, 8vo, pamphlet.

Brooks, Charles T., Newport, R. I. Carriers New Year's Addresses, Jan. 1, 1865.

Brooks, Henry M. Gospel of St. Mark, tr. and arranged by L. A. Sawyer, 1 vol., 12mo.

Brooks, M. C., James. Speech of J. Brooks in U. S. Congress, Dec., 1864. 8vo, pamph.

Burrage, Wm. W., Boston. Reports of Secretary of Class 1856 of Harvard for 1860, 1861 and 1865, 8vo, pamphlets.

Chase, George C. Friends' Review, 16 Nos.

Chase, George H. The Boatswain's Whistle, National Sailor's Fair, Boston, Nov. 1864, 1 vol., 4to.

Chase, Mrs. George H. The Sanitary Commission Bulletin, Nos. 1 to 32 incl., 8vo. The Sanitary Reports, Vol. 1 and Vol. 2. Nos. 1 to 18, 4to, Louisville, Ky, 1863. 30 Miscellaneous publications of the Sanitary Commission.

Choate, Wm. G. Rep. Adj. Gen. Mass. 1863, 8vo, 1 vol. Report of Commissioners of Agric. for 1862, 1 vol., 8vo. Manuals of Mass. Legis. for 1860 and 1861, 2 vols., 18mo. Midgley's Sights in Boston and Suburbs, 1 vol., 18mo. 45 Pamphlets.

Cole, Mrs. N. D. Salem Gazette for 1864, 1 vol., fol. Boston Daily Traveller for 1864, 2 vols., fol.

Colman, Benjamin. The act of Tonnage and Poundage and rates of Merchandise, 1 vol., 8vo, London, 1702.

Dawson, Henry B., Morrisania, N. Y. Correspondence between John Jay and H. B. Dawson, etc., concerning the Federalist, 8vo, pamph., New York, 1864.

Eastern Railroad, Directors. 30th Annual Report, 8vo, pamph.

Forrester, Mrs. John. The Overland Friend of India, files for 1858, 59, 60, 61, 62, 63, Serampore. Manuscript of a Hindostanee Poem on Palm leaves; supposed to be 500 years old.

Goodell Jr., Abner C. Lynn Directories, 1851, 1854, 1856, 1858, 4 vols., 16mo. Mass. Register, for 1858, 1 vol., 8vo. Boston Almanacs, 1861, and 1862, 2 vols., 16mo. 20 Pamphlets.

Green, Samuel A., Boston. Charleston Directory for 1862, 1 vol., 12mo. 8 Pamphlets.

Guild, R. A., Brown University. Jackson's account of R. I. Churches, 1 vol., 8vo. Ann. Cat. of Brown Univ. for 1856, 7, 8, 9, 60, 64. 16 Pamphlets.

Hall, James, Albany, N. Y. Account of Fossils of the Niagara Group, by J. Hall, 8vo, pamph.

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Hanaford, Mrs. P. A., Reading. The Young Captain, a Memorial of Capt. Richard C. Derby, by Mrs. P. A. Hanaford, 1 vol., 16mo, Boston, 1865.

Holmes, John C. 25 Pamphlets.

Hutchinson, T. J. The Country Justice, by M. Dalton, 1 vol., fol., London, 1626.

Ives, Henry P. Robinson's Ancient History, 1 vol. Everett, L. S., Sacred Songs, 1 vol., 16mo. Jackson's Questions on the Lessons, &c., of the Church Service, No. 1, 1 vol., 16mo. Marshall's Public School Account Books. Worcester's Historical Atlas. 24 pamphlets. The American Publishers Circular for 1863.

Kilby, W. H., Eastport, Me. Address of Gov. Cony to Maine Legis. Jan'y 5, 1865, 8vo, pamph. 9th Ann. Rep. of Sect'y Maine Bd. of Agric., 1864, 8vo., pamph. Legis. Register of Maine, 8vo. pamph.

Langworthy, I. P., Boston. 152 Pamphlets, being Reports of various Charitable Societies, Minutes of Congregational Associations, &c.

Lewis, Winslow, Boston. Address at meeting N. E. Hist. Gen. Soc., 8vo., pamph., Boston, 1865. Report of Trustees of Mass. Gen. Hospital for 1864, 8vo, pamph.

Lord, N. J. Files of Boston Post for Oct., Nov., Dec., 1864.

Loring, George B. Files of Boston Post for 1863 and 1864, and Jan'y and Feb'y, 1865.

Miles, M., Lansing, Mich. Catalogue of Michigan State Agric. Coll. for 1864, 8vo, pamph. 2d Ann. Rep. of Sect'ry of Bd. of Agric. of Mich. for 1863, 8vo, pamph.

Nelson, Henry M., Georgetown. Ann. Rep. of Auditing and School Committees for 1865, 2 pamph., 8vo.

New York Chamber of Commerce. Annual Reports for 1858, 1859, 1860, 1861, 1862, 1863, 1864, 6 vols, 8vo. 30 Pamphlets, publications of the Chamber.

Nichols, George. Burnham's Historical Directory at Rindge, N.H., Nov. 14, 1861, 8vo, pamph. 1st An. Rep. of Discharged Sailor's Home, 8vo, pamph., Boston, 1863. Christian Enquirer for 1864, 1 vol., folio.

Packard Jr., A. S., Brunswick, Me. Synopsis of Bombycidæ of U. S. A., 8vo, pamph.

Paine, Nath'l, Worcester. Worcester Directory, 1865, 1 vol., 12mo.

Palfray, Charles W. Mass. Legis. Doc. for 1864, 2 vols., 8vo. 30 pamphlets.

Parish, A., Springfield. Report of School Comm. of Springfield, for 1864, 8vo, pamph.

Pease, Geo. W. Statement of the Account of Danvers from Feb'y 1864 to Feb'y 1865, 8vo, pamph.

Phillips, W. P. The Savannah Daily Herald and Savannah Republican.

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RANTOUL, R. S. 24th, 25th, 26th Ann. Rep. of Mass State Bd. of Education, 3 vols, 8vo. Report of School Comm. of Boston, 1861. 1 vol., 8vo. Code Investigation 1860, U. S. Pub. Doc., 1 vol., 8vo. 7 Pamphlets.

SANBORN, FRANCIS G., Boston. Economical Entomology by F. G. S., 8vo, pamph.

SIBLEY, JOHN L., Cambridge. Ann. Rep. of Pres. and Treas. of Harvard College, 1863—4, 8vo, pamph.

STONE, BENJ. W. Valentine's Manual of the Common Council of New York. 1864, 1 vol., 12mo.

STONE, EDWIN M., Providence. 23d Ann. Rep. of the Ministry at Large in Providence, 8vo, pamph.

TAYLOR, SAMUEL L., Philadelphia, Ann. Rep. of Lib. of Penn. Hist. Society, 8vo, pamph., Philad., 1865.

UPHAM, WM. P. Flint's Agriculture of Mass., 1861, 1 vol., 8vo. Mass. Railroad Returns, 1863, 1 vol., 8vo. Ann. Rep. of Mass. Bd. of State Charities, 1 vol., 8vo, Boston, 1865.

WATERS, J. LINTON, Chicago. Ann. Rev. of Trade of Chicago in 1864. 8vo, pamph. Message of R. Yates, Gov. of Illinois, to the General Assembly, Jan'y 2, 1865, 8vo, pamph. 5th Biennial Report of Sup't of Public Instruction of Illinois, 1863–4, 8vo, pamph. Address of R. J. Oglesby, Gov. of Illinois, to Gen'l Assem., Jan'y 16, 1865, 8vo., pamph.

WHEATLAND, STEPHEN G. 22 Pamphlets.

BY EXCHANGE.

AMERICAN ANTIQUARIAN SOCIETY. Proceedings of Annual Meeting, Oct. 21, 1864, 8vo, pamph.

AMERICAN PHILOSOPHICAL SOCIETY. Proceedings, vol. IX, No. 72. 8vo, pamph. List of Members, 1865, 8vo, pamph.

CANADIAN INSTITUTE. The Canadian Journal for Jan'y, 1865.

EDITORS: American Journal of Science and Art, Jan. and Mch., 1865.
Florida Union.
Historical Magazine, for Jan. and Feb., 1865.
Haverhill Gazette.
Essex Banner, Haverhill.
Lawrence American.
Lynn Weekly Reporter.
The Reader, London, Eng.
The Newburyport Star.
The American, Salem.
Savannah Daily Herald.
Tuolumne Courier.
Salem Observer.

IOWA HISTORICAL SOCIETY. Annals of Iowa, No. 9, Jan., 1865, 8vo, pamphlet.

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MASSACHUSETTS HISTORICAL SOCIETY. Collections, Vol. VII, 4th ser.

MASSACHUSETTS STATE LIBRARY. Report of the Librarian for the year ending September 30th, 1864, 8vo, pamph.

MINNESOTA HISTORICAL SOCIETY. Collections for the year 1864, 8vo, pamphlet.

NEW BRUNSWICK NATURAL HISTORY SOCIETY. Jones on Ocean Drifts and Currents, 8vo, pamph. Bailey's Notes on Geol. and Botany of New Brunswick, 8vo, pamph. Bailey's Report on Mines and Minerals of New Brunswick, 8vo, pamph.

NEW ENGLAND HISTORIC-GENEOLOGICAL SOCIETY. Tercentenary celebration of the Birth of Shakespeare, April 23, 1864, 8vo, pamph. Lewis's Address before N. E. H. G. Soc., Jan. 4, 1865, 8vo, pamph. Tribute to the memory of Edward Everett, Jan. 17, and Feb. 1, 1865, 8vo, pamph.

NEW JERSEY HISTORICAL SOCIETY. Collections, vol. VI, 8vo, Newark, 1864. Proceedings, vol. X, No. 1, 8vo, pamph.

NEW YORK STATE LIBRARY, TRUSTEES OF. Instructions on taking Census of New York, 1865, 8vo, pamph.

PHILADELPHIA ACADEMY OF NATURAL SCIENCES. Proceedings for Nov. and Dec., 1864.

PHILADELPHIA MERCANTILE LIBRARY COMPANY. 17, 19, 21, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 41, 42 Annual Reports. Historical Sketch, 8vo, pamph. Special Report, April, 1863, 8vo, pamph.

PUBLISHERS. North American Review, Jan'y, 1865.

BY PURCHASE.

Saint John—The letters from an American Farmer, 1 vol., 12mo, Philadelphia, 1793. Sunderland—The testimony of God against Slavery, 1 vol., 16mo, Boston, 1838. United States, Foreign conspiracy against the liberties of, 1 vol., 16mo, New York, 1835. Rankin's Letters on American Slavery, 1 vol., 16mo. Boston, 1833. Bourne, The Book and Slavery irreconcileable, 1 vol., 12mo, Philadelphia, 1816. Paxton's Letters on Slavery, 1vol., 12mo, Lexington, Ky., 1833. Duncan's Treatise on Slavery, 1 vol., 12mo, New York, 1840. Clarkson's Essay on the Slavery and commerce of the Human Species, 1 vol., 12mo, Philadelphia, 1804. Buxton's Remedy for the Slave Trade, 1 vol., 12mo, New York, 1840. Thatcher's Indian Biography, 2 vols., 16mo, New York, 1832. Autobiography of Henry C. Wright, 1 vol., 12mo, Boston, 1849. Stuart's Memoir of Granville Sharp, 1 vol., 12mo, New York, 1836. Selections from the Writings and Speeches of William L. Garrison, 1 vol., 12mo, Boston, 1852. Memoir of Sebastian Cabot, 1 vol., 8vo, Philadelphia, 1831. Morse's system of Modern Geography, 1 vol., 8vo, Boston, 1814. Herrick.—A Genealogical Register of the name and family of Herrick, 1 vol., 8vo, Bangor, 1846. Secret Instructions of the Jesuits, printed verbatim from the London copy of 1725, 1 vol., 16mo, Princeton, N.

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J., 1831. A. Bradford, New England Chronology, 1 vol., 12mo, Boston, 1843. Dowling, John.—The burning of the Bibles, defence of the Protestant version of the Scriptures, 1 vol., 16mo, Philadelphia, 1843. A Platform of Church Discipline of Synod at Cambridge in 1648, 1 vol., 12mo, Boston, 1808. A Book for New Hampshire Children in familiar letters, 1 vol, 12mo, Exeter, 1823. Edwards, Jonathan—A Treatise concerning the Religious affections, 1 vol., 12mo, Boston, 1768.

MONDAY, APRIL 3. Regular meeting.

Vice President Goodell in the chair.

Letters were read from:

Baron Osten Sacken, Russian Consul General, New York; John Akhurst, Brooklyn, N Y.; Philip S. Sprague, Quincy; Chas. M. Wheatley, New York; M. S. Bebb, Washington; Dr. H. C. Wood jr., Philadelphia; Dr. Wm. Wood, East Windsor Hill, Ct; Wm. S. Vaux, Philadelphia; John Krider, Philadelphia; S. Jillson, Feltonville; D. G. Elliot, New York; T. McIlwraith, Hamilton, C. W.; John H. Thomson, New Bedford; Chas. J. Sprague, Boston; Wm. A. Smith, Worcester; B. Billings, Ottawa, C. W.; Dr. John L. LeConte, Philadelphia; Homer F. Bassett, Waterbury, Ct.; Nathl. Paine, Worcester; Sanborn Tenney, Cambridge; Isaac Lea, LL.D., Philadelphia; Geo. W. Peck, New York; Prof. James Hall, Albany, N. Y.; Dr. Theo. A. Tellkampf, New York; Dr. John W. Greene, New York; P. W. Sheafer, Pottsville, Pa.; H. A. Cutting, Lunenburg, Vt.; Prof. O. P. Hubbard, Hanover, N. H.; J. O. Treat, Lawrence; Dr. J. W. Robbins, Uxbridge; Thos. Barlow, Canastota, N. Y.; Dr. F. J. Bumstead, New York; W. W. Denslow, Inwood Station, N. Y.; Alex. Agassiz, Cambridge; H. F. King, Salem; D. M. Balch, Salem; Rev. David Weston; Worcester; G. F. & R. Matthew, St. John, N. B.; B. P. Mann, Concord; J. L. Sergeant, Philadelphia; Thomas Bland, Brooklyn, N. Y.; Chas. L. Blood, Taunton; Aliston Bacon, Natick; Prof. J. Leidy, Philadelphia; E. T. Cresson, Philadelphia; Jacob Ennis, Philadelphia; F. H. Hough, Albany, N. Y.; G. J. Bowles, Quebec, Canada; Prof. L. Agassiz, Cambridge; James Lemoine, Quebec, Canada; Geo. E. Brackett, Belfast, Me.; R. H. Brownne, New York; Ewd L. Graef, Brooklyn, N. Y.; Vincent Barnard, Kennett Square, Penn.; T. A. Greene, New Bedford; Prof. E. D. Cope, Philadelphia; J. T. Rothrock, McVeytown, Pa.; J. A. Allen, Cambridge; Alpheus Hyatt, Baltimore, Md.; Ed. S. Morse, Gorham, Me.; Prof. A. E. Verrill, New Haven, Ct.; T. A. Cheney, LL D., Havana, N. Y.; John G. Hodgins, Toronto, C. W.; Rev. Chester Dewey, Rochester, N. Y.; John Macoun, Belville, C. W.; R. P. Whitfield, Albany, N.

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Y.; J. V. C. Nellis, Auburn; J. P. Haskell, Marblehead; John Orne jr., Salem; Rev. Joseph Banvard, Worcester; Prof. T. C. Porter, Lancaster, Pa.; Stephen Salisbury jr., Worcester; Prof. S. F. Baird, Smithsonian Institution; L. Satterlee, New York; Prof. J. L. Russell, Salem; William Couper, Quebec, Canada, relating to the publications: N. Brown, Boston; Wm. Stimpson, Corr. Sect., Chicago Acad. Nat. Sci.; A. L. Babcock, Sherborn; Rev. E. C. Bolles, Portland, Me.; Capt. N. E. Atwood, Provincetown, on business: Trustees of Boston Public Library, acknowledging the receipt of publications: E. F. Stone, Newburyport, accepting membership.

The Superintendent called the attention of the meeting to the fifty mounted specimens of birds and mammals on the table, stating that all the species were new to the collection and that they were the skins presented by the Chicago Academy of Natural Sciences and the Lyceum of Natural History of William's College.

Gilbert L. Streeter read a communication entitled, "Salem one hundred years ago," suggested by a perusal of a Dudleian lecture sermon by Rev. Thomas Barnard of Salem, delivered in May 1768, and printed in Salem by Samuel Hall, who about that time opened a printing office in Salem.

Remarks were offered by Messrs. Wildes, T. Ropes, and the chair, and on motion of the Secretary, a copy of the paper read by Mr. Streeter, was requested for publication in the Historical Collections.

Edward S. Thayer, Nathaniel Kinsman, Jonathan Ropes and Charles H. Pepper of Salem, were elected Resident Members.

MONDAY, APRIL 17. Regular meeting.

Rev. G. D. Wildes in the chair.

Letters were read from:

Prof. J. Henry, Sect. Smithsonian Institution; Isaac Lea, LL.D., Philadelphia, Pa.; Prof. C. A. Joy, Columbia College, New York; Dr. Wm Stimpson, Cor. Sect. Chicago Acad. Natural Sciences; Capt. A

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Hyatt, Baltimore, Md.; Dr. H. C. Wood jr., Philadelphia; Rev. C. J. S. Bethune, Sect. Entomological Soc. of Canada; Dr. J. H. Salisbury, Cleveland, Ohio; W. W. Cary, Coleraine, Mass.; J. G. Sanborn, Cherryfield, Me.; Miss Julia H. Spear, Burlington Vt.; B. P. Mann, Concord, Mass.; Prof. Traill Greene, Easton, Pa.; D. G. Elliot, New York; S. B. Mead, Augusta, Ill.; Dr, J. W. Robbins, Uxbridge, Mass.; Dr. Asa Horr, Dubuque, Iowa; A. N. Prentiss, Lansing, Mich.; Dr. C. C. Abbott, Trenton, N. J.; J. R. Willis, Halifax, N. S.; John Kirkpatrick, Sect. Cleveland Acad. Natural Sciences; C. A. Emery, Springfield, Mass.; Dr. Ezra Michener, Avondale, Pa.; G. C. Brown, Mt. Holly, N. J.; J. F. Knight, Sect. Entomological Society of Philadelphia; A. L. Babcock, Sherborn, Mass.; Rev. J. E. Long, Hublersburg, Pa.; Isaac A. Pool, Chicago, Ill.; Frank Stratton, Natick, Mass.; C. F. Austin, Closter, N. Y.; Wm. W. Stewart, Custodian, Buffalo Society Natural Sciences; Prof. L. W. Bailey, University of New Brunswick; J. P. Lesley, Philadelphia; E. Tatnall jr., Wilmington, Del.; J. A. Allen, Cambridge; W. H. Niles, Cambridge; C. F. Hartt, Cambridge; O. H. St. John, Cambridge; Prof. T. C. Porter, Lancaster, Pa.; H. S. Babbitt, Asst. Sect. Ohio State Bd. of Agriculture; Prof. How, King's College, N. S.; D. Wilkins, Littleton. N. H.; Saml. P. Fowler, Danvers, Mass.; P. S. Sprague, Quincy, Mass.; J. D. Sergeant, Philadelphia Acad. Nat. Sciences; Wm. Gossip, Sect. Nova Scotian Institute of Nat. Science; Dr. H. M. Paine, Albany, N. Y.; H. A. Cutting, Lunenburgh, Vt.; B. S. Lyman, Philadelphia; Elihu Hall, Athens Ill.; Dr. Daniel Clark, Flint, Mich.; Dr. J. A. Meigs, Philadelphia, Pa.; Prof. D. S. Sheldon, Griswold College, Davenport, Iowa; R. Kennicott, Director, Museum Acad. Nat. Sciences, Chicago, Ill.; B. F. Mudge, State Geologist of Kanzas, Quindaro, Kanzas; Wm. S. Sullivant, Columbus, Ohio; Prof. F. Poey, Habana, Cuba; J. G. Arnold, Worcester; Dr. J. C. Draper, New York; Prof. S. S. Haldeman, Columbia, Pa.; Prof. A. E. Verrill, Yale College; C. M. Tracy, Lynn; Wm. S. Vaux, Philadelphia; Dr. Theo. Tellkampf, New York; E. T. Cresson, Corresp. Sect. Entomological Society of Philadelphia; Prof. Leo Lesquereux, Columbus, Ohio, relating to the Publications: C. M. Wheatley, relating to an exchange of specimens: Miss Anna L. Coffin, Newbury; C. M. Tracy, Lynn; Dr. Wm. Wood, Portland, Me.; N. Brown, Boston; Capt. N. E. Atwood, Provincetown, on business: G. A. Boardman, Milltown, Me.; W. W. Denslow, New York, offering to send specimens to the Museum: Albert G. Browne, Charleston, S. C.; J. C. Convers; Mrs. G. H. Chase; Blagden & Co., Boston, announcing the transmission of books for the Library: Smithsonian Institution, acknowledging the receipt of Publications: Charles Henry Pepper, accepting Membership.

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Donations to the Library and Museum were announced.

Professor A. E. Verrill made some remarks upon the Iron ores found in the New England States and contiguous part of New York. Two kinds of ore were mentioned, the Hematitic and the Magnetic oxide. The bog ore found in our low lands resembled the Hematitic in its composition but is usually much inferior in quality.

Francis C. Butman, and Francis A. P. Rust, of Salem, were elected Resident Members. Professor Edward D. Cope of Philadelphia, Professor James Hall of Albany, and Baron Osten Sacken, Russian Consul General at New York, were elected Corresponding Members.

The Chair stated that at the last meeting, the news of the evacuation of Richmond had been received, and that on the morning of the Monday following the announcement of the surrender of Lee's Army was published to the Country. This day startling news of a different character was received: the death of the President of the United States, at Washington, on Saturday, April 15, at 7.20 o'clock in the morning, occasioned by a bullet wound from a pistol in the hands of an assassin on the evening previous. These events deserve a place on our records.

Robert S. Rantoul introduced a series of appropriate resolutions, which were unanimously adopted and ordered to be placed upon the records of the Institute. Dr. George B. Loring, on moving their adoption, paid an eloquent and deserved tribute to the memory of the late President. Professor A. Crosby followed Dr. Loring with suggestive remarks.

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MONDAY, MAY 1. Regular meeting.

Vice President Goodell in the chair.

Letters were read from:

Chas. Stodder, Boston; Samuel R. Carter, Paris Hill, Me.; Wm. A. Haines, New York; Prof. T. S. Parvin, Iowa City; Asst. Surg. B. G. Wilder, 55th Mass. Vols.; Chas. Wright, Wethersfield, Ct.; Prof. Edw. Hitchcock, Amherst College; Dr. John Gundlach, Habana, Cuba; Tryon Reakirt, Philadelphia; Thomas Meehan, Editor of the Gardener's Monthly; S. I. Smith, Norway, Me.; John Bolton, Portsmouth, Ohio; S. D. Poole, Lynn; J. D. Parker, Steuben, Me.; Prof. Dana, Yale College; Isaac C. Martindale, Byberry, Pa.; Prof. D. S. Sheldon, Griswold College; Wm. S. Sullivant, Columbus, Ohio; Prof. H. A. Thompson, Otterbein University; G. F. Matthew, St. John, N. B.; Prof. A. E. Verrill, Yale College; S. B. Mead, Augusta, Ill.; Dr. J. Aitken Meigs, Philadelphia; W. J. Howard, Central City, Colorado; Dr. S. A. De Morales, Habana, Cuba, relating to the Publications: Wm. Wood & Co., New York; Wm. W. Stewart, Custodian, Buffalo Soc. Nat. Sciences, on business: A. M. Edwards, New York, announcing the formation of the American Microscopical Society in New York.

Donations to the Library and Museum were announced.

A large number of native plants, collected by Nathaniel Hooper and James H. Emerton, were placed on the table and were explained by Geo. D. Phippen, who had a few interesting remarks to make on each of the various species. Mr. Phippen thought that the opening of the flowers this year, was about ten days in advance of many previous years.

Messrs. Hooper and Emerton gave an account of the special locality of several of the rarer species. Mr. Emerton read a few notes relating to the time of flowering of a number of species of plants, the present season, and also as to the first appearance of several species of insects this spring.

F. W. Putnam stated that the Toads commenced spawning on the 16th of April. He then made some remarks, suggested by those of Mr. Phippen, upon the various theories regarding the origin of species.

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Messrs. F. W. Putnam, Charles Davis, W. P. Upham and the Secretary were appointed a committee to nominate officers for the ensuing year, and report the same at the annual meeting.

Edward Dean and T. Francis Hunt, of Salem, were elected Resident Members. E. T. Cresson of Philadelphia, was elected a Corresponding Member.

WEDNESDAY, MAY 10. Annual meeting.

Vice President Goodell in the chair.

The reports of the Secretary, Treasurer, Superintendent, Curators and Committees were read and accepted. From these reports the following particulars may be specified.

The Society is in a good and healthy condition. The receipts from the assessments of the Resident Members have been greater than in any preceding year, which was also the case in regard to the sales of publications. During the year one hundred and fifty seven Resident and twelve Corresponding Members have been elected. Eight Resident Members have removed from the county, and the following have died during the year: Wm. B. Brown, Henry Hubon, Edward L. Perkins, Charles W. Swasey, Lucy Treadwell, George A. Ward, Mary E. Wheatland, Samuel Webb, all of Salem. The sad intelligence of the decease of the following Corresponding Members has been received: Hon. Edward Everett of Boston, Mass., Professor Benjamin Silliman of New Haven, Conn., Carlton A. Shurtleff of Roxbury, Mass., and William B. Fowle of Medfield, Mass. Biographical notices of the deceased Members will be printed in the Historical Collections. The present number of Resident Members is five hundred and two, of Corresponding, one hundred and thirty-six.

Five field meetings have been held during the past season; at East Saugus, Wenham Pond in Beverly, Gloucester, Rockville chapel in South Danvers and Newburyport. These meetings have been largely attended, and a greater interest than at any previous season has been manifested.

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Evening meetings have been held on the second and fourth Mondays of each month for the first part of the winter, and the first and third Mondays afterwards, at the rooms of the Institute, commencing in October and closing with the annual meeting in May. The large number attending these meetings calls for a more commodious meeting room at as early a day as practicable.

The Lecture Committee, having adopted the plan of having courses of lectures on special subjects and of an educational character, delivered to appreciative audiences, in lieu of the more extended courses of a miscellaneous character of former years, made arrangements with Messrs. Putnam and Tracy, who have taken the initiative, and the committee trust that this plan will be adopted in other branches.

F. W. Putnam, on the five Thursday evenings in March, delivered a course of lectures on "Insects, their habits and structure," at Lyceum hall, under the auspices of the Institute, which were very instructive and were well attended by highly appreciative and intelligent audiences. At the close of the course the following resolution, moved by Prof. A. Crosby and seconded by Gen. H. K. Oliver, was unanimously adopted:

"*Resolved:* That we express to Mr. Putnam our high appreciation of the valuable and interesting Course of Lectures he has just completed; and the personal thanks and obligations of our community to him for these labors in the cause of science and public improvement, especially in view of his generous appropriation of the greater part of the proceeds to the benefit of the Museum of the Essex Institute."

Cyrus M. Tracy of Lynn has delivered two of a series of eight lectures on Botany at the rooms of the Institute on the two preceding Saturday afternoons.

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The Treasurer presented the following statement of the financial condition, for the year ending May, 1865.

GENERAL ACCOUNT.

Debits.

Athenæum Rent, half fuel, &c.	$535 53
Publications, $1001 25; collecting assessments, $23 10,	1024 35
Postage and Express, $76 90; Gas, $11 90,	88 80
Printing, $26 75; Stationery and Books, $33 03,	59 78
Sundries,	41 06
Historical account,	143 50
Natural History and Horticultural account,	59 34
Balance in Treasury,	12 27
	$1964 63

Credits.

Balance of last year's account,	7 04
Dividends Webster Bank, $60 00; Books sold, $180 19,	240 19
Sale of Publications,	809 40
Assessments,	908 00
	$1964 63

NATURAL HISTORY AND HORTICULTURE.

Debits.

Preservatives &c., $65 00; Specimens, $34 00,	99 00
Cases, $56 75; Bottles, $6 60,	63 35
Horticultural Exhibition,	53 10
	$215 45

Credits.

Horticultural Exhibition,	104 11
Dividends Lowell Bleachery,	40 00
" Portland, Saco & Portsmouth Railroad.	12 00
General Account,	59 34
	$215 45

HISTORICAL ACCOUNT.

Debits.

Binding, $100 00; Books, $98 50,	$198 50

Credits.

Dividends Naumkeag Bank,	17 00
Coupons Michigan Central Railroad,	38 00
General Account,	143 50
	$198 50

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The Library is daily in receipt of additions. A large increase is consequent upon the exchanges that have been arranged with different societies, and editors or proprietors of historical and scientific journals, newspapers, &c.

The additions during the year, principally by donation or exchange, are:

Octavos and lesser fold,	500
Quartos 4, Folios 12,	16
Newspapers, Folios, (files)	88
Pamphlets and Serials,	1,500
	2,104

The above have been contributed by one hundred and twenty individuals and fifty-seven Societies, Editors of Journals and the various departments of the State and General Government.

The publication of the Proceedings and Historical Collections has been continued during the year: of the former, vol. III and Nos. 1, 2, 3, and 4 of vol. IV have been printed; of the latter, volume VI.

The annual Exhibition of Fruits, Flowers and Vegetables took place on Wednesday, Thursday and Friday, Sept. 21, 22, 23, and exceeded our expectations after the severe unprecedented drought. There were many plates of fine pears. The leading feature was the display of outdoor grapes, which was judged the finest ever exhibited in the state. The vegetables were particularly fine. The flowers, as usual, were very attractive and contributed essentially to the general appearance of the rooms.

The Historical Department has been increased during the year by the addition of two hundred specimens to the Ethnological section, a large number of valuable manuscripts and several engravings and portraits. The room given to this department is much crowded, rendering a proper display of the collection impossible and obliging the storage of many of the engravings and manuscripts for the want of accommodation.

Two hundred and thirty-seven donations, embracing eight thousand five hundred and three specimens, have been received for the Natural History Department during the year. The work in the various sections of the depart-

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ment has been carried on with good results, and several are in a forward state of arrangement. Catalogues have been commenced and in some of the classes the specimens are as far arranged as the limited supply of case room, jars and alcohol will allow for the present. We are under great obligations to Professor Verrill, of Yale College, for the identification and arrangement of the Polyps, and Acalephs. These classes have been largely increased by the valuable addition of several hundred specimens of East Indian corals, collected and presented by Capt. W. H. A. Putnam. By the kindness of Professor Verrill, and Mr. Alexander Agassiz, who had previously identified the collection of Echinoderms, we have the specimens belonging to the branch of Radiata so far identified that it is proposed to publish a catalogue of the collection at an early day. We are also indebted to Rev. E. C. Bolles, of Portland, for the identification of many of our native land and fresh water shells.

It is to be hoped that the work on the collection will not long be impeded by the present insufficient supply of cases and materials for the proper exhibition of the specimens. Much larger accommodations are required for the various departments of the Museum and these cannot be supplied to the extent desired without an addition to the present building by which, at least, three times the present amount of case room can be obtained. Not more than three-fourths of our specimens are now visible to the public, or of use for study, as many are stowed in kegs and cans in the cellar and in drawers and boxes in the hall. A partial supply of case room could be obtained by the construction of a few railing and table cases in the hall for the Insects, Fossils and Birds' nests and eggs. The cases for the pinned Insects are needed at once, for this valuable collection is being destroyed by its insect enemies, and until more room is given to it this destruction cannot be wholly prevented, even by the constant vigilance of the Curator

As the arrangement of the various classes is perfected large numbers of duplicate specimens are separated, which will be presented to such institutions and individuals as will use them for the advancement of science, in accordance with the rule adopted by the Institute regarding

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the distribution of its duplicates. Though a number of collections are now being packed for transmission to various persons and societies the following, only, have been sent during the past year.

To the Cabinet of Yale College:

40	species,	102	specimens, of	Corals.
25	"	41	" "	Echinoderms.
7	"	20	" "	Sponges.
4	"	5	" "	Tunicates.

To A. L. Babcock, of Sherborn, Mass.:

168 specimens of South American and
2 " " African Insects.

To the Chicago Academy of Science:

25 species, 110 specimens, of foreign Helices.

To the Museum of Comparative Zoölogy:

1 specimen of *Goniaster cuspidatus* Gray, from the West Coast of Africa.

To J. G. Shute of Woburn, Mass.:

28 species, 59 specimens of foreign Shells.

To Rev. E. C. Bolles, of Portland, Me.:

73 species, of several specimens each, of foreign and American land and fresh water Shells.

The following estimate of the number of specimens (exclusive of a large number of duplicates) in the various departments of the Museum presents a general view of the character of the collection at the present time.

HISTORICAL DEPARTMENT.

The section of Ethnology contains about 1400 specimens, illustrating the habits, costumes, war and domestic implements of the various races and nations.

In the section of Manuscripts there are a very large number of Manuscripts relating to our early civil and ecclesiastical history.

In the section of Fine Arts there are several hundred Portraits, Paintings and Engravings, many of which are of great historical value.

DEPARTMENT OF NATURAL HISTORY.

	Specimens.
Geological specimens, about	200
Minerals, 1896 specimens, of which 196 are from Essex County,	1896

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FOSSILS.

Radiates,	186	species,	250	specimens.		
Mollusks,	1108	"	2000	"		
Articulates,	20	"	50	"		
Vertebrates,	90	"	120	"		
Plants,	135	"	200	"	*Fossils*, .	2620

RECENT.

Plants, about 5000 species, native and foreign, among which are nearly all the species found in Essex County, a number of specimens of wood, and a large number of seeds &c., in all about 6500. *Plants*, . 6500

Sponges, 42 species, 100 specimens. *Sponges*, . 100

Acalephs, *Polyps*, *Echinoderms*, } 446 species, 1500 specimens. *Radiates*, . 1500

Mollusks, in alcohol, 500 species, 1000 specimens.
Shells, 4152 species, 8000 specimens.
Mollusks, . 9000

Worms, 110 species, 200 specimens.
Crustaceans, 150 " dry, 330 species in alcohol, about 1300 specimens.
Insects, 21000 specimens pinned, 5000 specimens in alcohol, of these 2000 species of the pinned have been catalogued.
Nests, 15 species, *Articulates*, . 27515

Fishes, 1000 species, 2000 specimens in alcohol, and about 200 specimens dry and mounted.
Reptiles, 400 species, 1000 specimens, principally alcoholic. (A fine collection of Turtles mounted.)
Birds, 100 species, 150 specimens in alcohol; 411 species, 500 specimens mounted.

Birds' nests,	50	species,	80	specimens.	
Birds' eggs,	180	"	425	"	
Mammals,	51	"	75	"	in alcohol;
"	65	"	70	"	mounted;
"	9	"	10	"	as skins.
					Vertebrates . 4510

Skulls of Mammals, 172 species, 230 specimens, of which 39 are human.

Skulls of Birds, . .	150	species,	200	specimens.	
Skulls of Reptiles, . .	27	"	27	"	
Skulls of Fishes, . .	10	"	10	"	
Skeletons of Mammals, .	12	"	12	"	
Skeletons of Birds, . .	4	"	5	"	
Skeletons of Reptiles, .	6	"	6	"	
Skeletons of Batrachians, .	10	"	30	"	
Skeletons of Fishes, .	8	"	8	"	
Parts of Skeletons, of Mammals,	8	"	8	"	
" " *Birds*,	10	"	10	"	
Teeth of Mammals, .	14	"	30	"	
Jaws of Fishes, . .	15	"	20	"	
Horns and Antlers, .	43	"	43	"	
				Osteological collection	639

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May not the Institute hope that its friends and the patrons of science will soon give that aid, which is so essential to promote its objects and to continue with success its usefulness in diffusing a knowledge of the works of the Creator and of the History of Mankind?

If an addition to our present accommodations and means could be obtained and a number of professional Naturalists, having the charge of the various branches of the department of Natural History, and also several assistants in the Library, who, in addition to the ordinary duties could classify and arrange the manuscripts, pamphlets, newspapers and other materials that appertain to the Historical department, be permanently attached to the institution, much good would be done to the cause of education in our community by well arranged collections and libraries, and also by free lectures illustrating the various objects of the Institute. Much could also be accomplished through the medium of our publications in advancing the cause of science, and also of historic research by the continuation of the printing of abstracts of wills, deeds and other documents which are deposited in the offices of the county of Essex, and other materials of an historical nature that may be obtained from various sources.

Letters were read from:

Prof. S. S. Parvin, Iowa City; Asst. Surg. B. G. Wilder, 55th Mass., Vol.; W. P. Alcott, Andover; Dr. Wm. Prescott, Concord, N. H.; J. W. P. Jenks, Middleborough; John Jenkins, Monroe, N. Y.; Rev. Joseph Blake, Gilmantown, N. H.; Edwin Harrison, St. Louis, Mo.; Dr. Simeon Shurtleff, Weatogue, Ct.; W. W. Jefferis, Westchester, Pa.; W. J. Beal, Cambridge; L. E. Chittenden, New York; Wm. H. Edwards, Newburgh, N. Y.; Wm. F. Hall, Boston; Theodore Howland, Sect. Buffalo Soc. Nat. Science; E. Lewis, Jr., Brooklyn, N. Y.; Chas. N. Hoyt, Providence, R. I.; John C. Trantivine, Philadelphia; Frederic Ware, Cambridge; Edward Norton, Farmington, Ct., relating to the publications: Elihu Hall, Athens, Ill.; Geo. C. Huntington, Kelley's Island, Ohio, relating to the collection of specimens: Prof. S. F. Baird, Smithsonian Institution, on business: F. C. Butman, accepting membership: A. G. Browne, department of the South, relating to the transmission of books for the library: Smithsonian Institution, acknowledging the receipt of publications: C. W. Felt, calling attention to Mr. Perkins' class in Phonography: A. Huntington, declining to be a candidate for the Presidency.

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The following officers were elected for the ensuing year:

PRESIDENT.

FRANCIS PEABODY.

VICE PRESIDENTS.

Of Natural History—SAMUEL P. FOWLER. *Of History*—A. C. GOODELL JR.
Of Horticulture—J. F. ALLEN.

SECRETARY AND TREASURER.

HENRY WHEATLAND.

LIBRARIAN.

CHARLES DAVIS.

SUPERINTENDENT OF THE MUSEUM.

F. W. PUTNAM.

FINANCE COMMITTEE.

J. C. Lee, R. S. Rogers, H. M. Brooks, G. D. Phippen, Jas. Chamberlain.

LIBRARY COMMITTEE.

J. G. Waters, Alpheus Crosby, H. J. Cross, G. D. Wildes, William Sutton.

PUBLICATION COMMITTEE.

A. C. Goodell Jr., G. D. Phippen, Ira J. Patch, C. M. Tracy, Wm. P. Upham, R. S. Rantoul, F. W. Putnam.

LECTURE COMMITTEE.

Francis Peabody, A. C. Goodell Jr., G. D. Phippen, George Perkins, James Kimball, G. W. Briggs, F. W. Putnam.

FIELD MEETING COMMITTEE.

Geo. B. Loring, C. M. Tracy, S. Barden, S. P. Fowler, J. M. Ives, G. D. Wildes, E. N. Walton, Charles Davis.

CURATORS OF NATURAL HISTORY DEPARTMENT.

Geology—H. F. Shepard;
Palæontology—H. F. King;
Comparative Anatomy—Henry Wheatland;
Articulata—J. H. Emerton;
Radiata—Caleb Cooke.
Mineralogy—C. H. Higbee;
Botany—C. M. Tracy;
Vertebrata—F. W. Putnam;
Mollusca—H. F. King;

CURATORS OF HISTORICAL DEPARTMENT.

Ethnology.

William S. Messervy, M. A. Stickney, John Robinson.

Manuscripts.

W. P. Upham, H. M. Brooks, S. B. Buttrick, G. L. Streeter, G. D. Wildes, E. S. Waters.

Fine Arts.

Francis Peabody, J. G. Waters, J. A. Gillis.

CURATORS OF HORTICULTURAL DEPARTMENT.

Fruits and Vegetables.

J. M. Ives, J. S. Cabot, R. S. Rogers, John Bertram, G. B. Loring, S. A. Merrill, W. Maloon, A. Lackey, G. F. Brown, C. H. Norris, C. H. Higbee.

Flowers.

Francis Putnam, William Mack, Benj. A. West, Geo. D. Glover.

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Voted; That the meetings on the first and third Mondays of each month be held at 4 o'clock P. M. until otherwise directed.

Voted; That the Curators of Horticulture be authorized to hold exhibitions of Fruits, Flowers, Vegetables &c., at such times and places as may be desirable; also to offer premiums and gratuities for specimens exhibited, under such regulations as they may adopt.

Voted; That Messrs. Goodell, Rantoul and Upham be a committee to prepare suitable resolutions expressive of the thanks of the Institute due to A. Huntington, the retiring President, for his valuable services during the four years which he has presided over the Institute.

On motion of Mr. Putnam, Chapter I, Section VI, lines five and six, of the By Laws were so amended as to read "make such use of the duplicates as may be beneficial to science."

George M. White, James A. Chamberlain, Jonathan Ropes and George Fowler, all of Salem, were elected Resident Members.

MONDAY, MAY 15. Regular meeting.

Vice President Goodell in the chair.

R. S. Rantoul, for the committee appointed at the annual meeting, submitted the following report which was adopted and a copy of it ordered to be transmitted to the retiring President:—

Whereas the Honorable Asahel Huntington having declined reelection to the Presidency of the Essex Institute after four years of acceptable service in that capacity, during which the Institute has prospered beyond precedent.

Therefore, *Resolved:* That we cannot forego this opportunity of putting upon record our appreciation of the virtues of his private character, and of the usefulness of his long professional and public career; together with the hope that he may hereafter look back upon his efforts, while President of this body, in behalf of sound learning, the

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diffusion of useful knowledge and the generous culture of letters, science and the arts, as not the least among the honorable services of a well spent life.

John L. Marks, William H. Silsbee, and Henry R. Gardner, of Salem, were elected Resident Members.

TUESDAY, JUNE 6. Adjourned Regular meeting.
Henry F. King in the chair.

On motion of the Superintendent it was *Voted:* That the thanks of the Institute be tendered to George C. Huntington, Esq., of Kelley's Island, Ohio, for the donation of a valuable collection of Fishes from Lake Erie, and also for his kindness in defraying the necessary expenses attending the same.

WEDNESDAY, JUNE 7. Field meeting at Nahant.

The society opened their series of Field meetings this day by a visit to the ever delightful retreats of Nahant. The number in attendance reaching over two hundred who took the regular conveyances from the Central Station, besides many who took other means and different hours for the passage. Arriving at the Methodist Chapel, which had been selected as the place of meeting, the company deposited their various provisions, and under the guidance of John Q. Hammond, Esq., the greater number set out to examine the curiosities of the place. Some, in search of particular objects, scattered here and there, to fish, or gather plants, or break the rocks for specimens of minerals. But most of the party made a circuit round the shore, passing the summer residences of Gen. Fremont, Prof. Longfellow, and that formerly of Prescott, the historian, as well as many more. The "Swallow's Cave" received due attention, as also those features of the eastern extremity, "Pulpit Rock," "Natural Bridge," "Castle Rock," and the "Spouting

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Horn." A brief stay was made about the crumbling ruins of the old Nahant Hotel, whose scorched and shivered stones yet bear up against the elements. Some pursued their walk to the "Maolis Gardens," so fancifully laid out and bedecked by the late Frederick Tudor, and puzzled themselves with his unexplained devices. On returning, and after a plentiful repast, the party assembled in the Chapel for the formal exercises of the afternoon, when the meeting was called to order by A. C. Goodell, Historical Vice President.

Letters were read from:

Rev. E. C. Bolles, Portland, Me.; Trübner & Co., London, Eng.; Mrs. B. F. Mudge, Quindaro, Kansas; E. L. Layard, Director of the South African Museum, Cape Town; Elihu Hall, Athens, Ill.; C. M. Tracy, Lynn; Smithsonian Institution; J. J. Babson, Gloucester; G. B. Loring; A. Lackey, Marblehead; John Howarth, Boston; H. R. Stiles, New York; David Choate, Essex; Dr. Wm. Prescott, Concord, N. H.; Dr. T. M. Brewer, Boston; Chas. M. Wheatley, Phœnixville, Pa.; Prof. Richard Owen, Indiana State University; B. O. Peirce, Beverly; A. S. Peabody, Cape Town, Africa; Geo. C. Huntington, Kelley's Isl., Ohio; Prof. A. E. Verrill, Yale College; Prof. James Hall, Albany, N. Y.; W. W. Denslow, Inwood, N. Y.; W. W. Stewart, Custodian, Buffalo Soc. of Nat. Sciences; Brown, Brothers & Co,, Boston, on various business matters: Sidney S. Lyon, Jeffersonville, Ind.; Rev. Samuel Lockwood, Keyport, N. J.; Dr. T. M. Logan, Sacramento, Cal.; Thure Kumlien, Busseyville, Wis.; D. G. Tompson, Montpelier, Vt.; Prof. S. F. Baird, Smithsonian Institution; Prof. C. C. Hamlin, Waterville College; H. B. Lord, Ludlowville, N. Y.; Codman & Shurtleff, Boston; W. A. Haines, New York; E. S. Morse, Gorham, Me.; W. J. Beal, Cambridge; Dr. Frederick Brendel, Peoria, Ill.; Prof. S. N. Norwood, Columbia, Mo.; Rev. E. B. Eddy, Waltham; Dr. John G. Thomas, Riviére-du-Loup-en-bas, Canada; Prof. Alex. Winchell, Ann Arbor, Mich.; G. A. Boardman, Milltown, Me.; A. L. Russell, Quebec, Canada; Henry Bannister, Evanston, Ill., relating to the Publications: Maine Historical Society, acknowledging receipt of Publications; Albert G. Browne; J. Vincent Browne; F. Cox; transmission of Specimens: Prof. James Hall, Albany; Henry R. Gardner; accepting Membership: F. Peabody, accepting the office of President: G. B. Loring, accepting the office of Chairman of Field Meeting Committee.

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Donations to the Museum and Library were announced.

Dr. George B. Loring being called upon said that he had been surprised in several ways to day. He had found evidences of greater antiquity on Nahant than he had supposed were to be seen on the continent. He had found a ruin here, whose worn and tottering stones showed more of the ravages of time than the broken arches of the Forum. He had been through Rome and many places in Europe of the older sort, but nowhere had he seen such worn and plainly antiquated piles as appeared on Nahant to day. Further on, he had found the very rocks carved with inscriptions in forgotten tongues. No one here to day could read them, no one could say what meant the '*epinon ek tes petras*' that still endured in the monumental granite of Nahant. Statues were here, but beyond the design of the old masters; frescoes, but wholly pre-Raphælite in their execution. He was full of wonder at what he had seen. He further spoke of the place as formerly a field for the simple agriculture of the early time, when the unambitious farmers drove their flocks here to graze by day and brought them home at night. He closed by an eloquent allusion to the restoration of peace, under which blessing the Institute could come to such delightful spots as this and continue its Field meetings.

John Q. Hammond, Esq., of Nahant, would speak in behalf of his townsmen and extend their welcome to the Institute in their visit to day. For himself, he felt little of the enthusiasm in the study of nature that some exhibited, but he could appreciate the purposes and the utility of the Society, and was glad to lend what help he might to promote its interests. A good field was surely here for exploration; students were constantly resorting to it, and its rare and curious wealth seemed only partly yet discovered.

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C. M. Tracy, of Lynn, gave a brief account of some points in the botany of the peninsula. A remarkable fact appears in the almost total absence of all heath-like plants from this place. It is said there are a few huckleberry bushes here; but not a pyrola, laurel, lambkill, blueberry, swamp-pink, or any such thing could he ever find. On the contrary, the field chickweed, a most lovely plant for the lawn, grows here abundantly, though rare or wanting in all the region round. Formerly, it is said, Nahant had heavy forests; but the settlers destroyed them, and since then a tree can scarcely be made to endure the climate. Persevering care has, however, partly retrieved the error, and the place is growing far greener than for years before.

F. W. Putnam, of Salem, gave some description of the zoölogical specimens taken during the day.

Wm. J. Beals, of Union Springs, N. Y., said he had been born and brought up in a country where there were no rocks, no ocean, no evergreen trees, and he had heard of these things in his childhood, as the inventions in a pleasant story. A few years ago, he had made a pilgrimage to New England that he might see these things; and he had set himself down by the sea for half a day at a time, full of delight as a child. You who live in the midst of these things have no idea of their true beauty. He gave a description of the curious plant called the sundew, which traps insects by the adhesive drops on its leaves.

Caleb Cooke, late of Zanzibar, East Africa, excused himself from speaking on account of feeble health. He had enjoyed the day and its rambles, and at another time would be glad to speak.

Abner H. Davis and Emery S. Johnson, of Salem, were elected Resident Members. John da Costa Soares, of Mozambique, E. C. A.; George C. Huntington, of Kelley's

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Island, Ohio; Professor Richard Owen, of New Harmony, Ind., and Professor Leo Lesquereux, of Columbus, Ohio, were elected Corresponding Members.

On motion of Mr. Tracy the thanks of the Institute were voted to the Proprietors of the Methodist Church for the use of their House for the meeting, and to Messrs John Q. Hammond, Edmund Johnson, George A. Perkins and other friends in Nahant for their favors on this occasion.

MONDAY, JUNE 14. Regular Meeting.

The President, Francis Peabody, in the chair.

Letters were read from:

W. W. Denslow, Inwood, N. Y.; S. M. Buck, Hancock, Mich.; A. S. Taylor, Santa Barbara, Cal.; Prof. J. G. Norwood, Columbia, Mo.; E. S. Morse, Gorham, Me.; Prof. Joseph Henry, Sect. Smithsonian Institution; N. Brown, Boston; Geo. C. Huntington, Kelley's Island, Ohio: H. W. S. Cleveland, Danvers; Andrew Lackey, Marblehead; Leverett Saltonstall, Newton, relating to general business and the transmission of books and specimens: Geo. Scarborough, Sumner, Kansas; Rev. A. P. Chute, Sharon, relating to the publications: J. J. H. Gregory, Marblehead; C. M. Tracy, Lynn; G. W. Skinner, New Bedford; N. E. Atwood, Provincetown, relating to the Field meetings: Abner H. Davis, accepting membership: G. H. Peirson, containing an invitation to join in the celebration of the fourth of July in Salem.

The Secretary submitted the following resolutions which were unanimously adopted.

The Institute having been invited to join in the celebration of the fourth of July in Salem:—

Resolved: That the coming anniversary of American Independence marks an epoch in the progress of civilization and the life of Nations to which no studious observer can be indifferent, and that this Historical Body cordially unite, in spirit, with the people of this community, in such demonstrations as shall impress upon the minds of all the character of the crisis through which the Nation has passed and the honorable place in history which awaits the defenders of their Country.

Resolved: That, whereas, the Members are widely scattered, and many of them will take part in the demon-

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stration in connection with other bodies, the Institute, grateful for the polite invitation, deem it unadvisable to take any prominent position; at the same time they will cheerfully render such assistance in their power, consistent with their regulations, as may contribute to the interest of the occasion.

The President, as chairman of the committee on the "First Church," presented a final report of the doings of the committee. The frame of the Church has been removed and placed in the rear of Plummer Hall, encased in an external structure of suitable strength to which it is bolted and is seen projecting from the plastering on the inside of the building. The Committee, in giving the key of the building to the Institute, do so, with the sincere wish, that the Holy House may be preserved to those who come after us, and handed down, from generation to generation, as a valued trust.

Rev. G. D. Wildes, after some appropriate remarks, moved that the report be accepted and that the thanks of the Institute be tendered to the committee, for the faithful and successful performance of their duty, which was unanimously adopted. [The report of the Committee will be published in full in the Historical Collections.]

R. S. Rantoul read a memoir of Major Thompson Maxwell, a soldier in the old French war, the Revolution, and the war of 1812.

On motion of Mr. Putnam, the memoir read by Mr. Rantoul was referred to the publication committee, for publication in the Historical Collections.

The thanks of the Institute were voted to Colonel E. F. Miller for the presentation of the original documents, from which the memoir of Major Maxwell had been compiled.

Mr. Putnam communicated, by title, a paper by E. S. Morse, on the "Classification of the Mollusca on the Princi-

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ple of Cephalization," accompanied with a plate. Referred to the Publication Committee.

Donations to the Library and Museum were announced.

H. R. Lovett of Beverly was elected a Resident Member.

THURSDAY, JUNE 24. Field meeting at Standley's Grove in Beverly.

This second Field meeting of the season was attended by a large party from Salem and the adjoining towns, who, after a pleasant forenoon's ramble in the woods and over the Laurel Ground, and a collation in the grove, assembled on the platform, when the meeting was called to order by Dr. G. B. Loring, Chairman of the Field meeting committee, who made a few remarks upon the history of the town, alluding to several of the worthy persons who once lived within its limits, as the Cabots, Nathan Dane, President Willard, of Harvard University, and others.

After the reading of the records of the last meeting, letters were read from the following:

Thomas Bland, New York; Thomas Mc Ilwraith, Hamilton, C. W.; Capt. Alpheus Hyatt, Baltimore, Md.; Thomas M. Peters, Moulton, Ala.; John Bolton, Portsmouth, Ohio; S. I. Smith, Norway, Me.; A. L. Babcock, Sherborn, Mass.; E. S. Morse, Gorham, Me.; Thomas Meehan, Germantown, Pa., relating to the publications: Prof. Theo. Gill, Smithsonian Institution, applying for the use of specimens: Prof. Leo Lesquereux, Columbus, Ohio, accepting Membership and notice of transmission of books for the library: Asst. Surg. A. S. Packard, Camp near Washington; C. M. Tracy, Lynn; Dr. W. Prescott, Concord, N. H.; Rev. S. Barden, Rockport, on business: B. F. Mudge, Quindaro, Kansas, stating that he will send fossils to the Institute: W. H. Dall & R. E. C. Stearns, San Francisco, relating to an exchange of specimens.

Donations to the Library an l Museum were announced.

Rev. G. D. Wildes read a poem written for the occasion by Mrs. P. A. Hanaford.

Dr. Henry C. Perkins, of Newburyport, read a paper of which the following is an abstract.

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Attempt to explain the formation, or development, of the cumulus or thunder cloud on the principles laid down by Mr. Espy in his Philosophy of Storms, modified somewhat as to the principle of the ascent of the air in the tornado and water spout.

On the 9th of August, 1852, a large cumulus cloud was observed in process of development, the cloud was soon capped by a dense, white vapor, (as if by a veil), showing that the air above the cloud was being lifted bodily (as it were) by the ascending column of hot air, above the dew point.

The dry bulb thermometer stood at 79° F., wet bulb at 69° F., the dew point being at 65° F.

The rain was soon seen to fall and in a few moments the lightning was observed, followed, at an interval of 45 seconds, by a clap of thunder. A heavy shower from this cloud fell at Hampton Falls.

Reckoning a fall in temperature of 1° for every 100 yards, the base of the cloud was about 1,400 yards above the surface of the Earth, and the top of the cloud about three times as high, or 4,200 yards.

If we suppose with Mr. Espy that the air cools in ascending at the rate of 1.5° for every hundred yards, the thermometer in and outside of the cloud would indicate a fall of 60° in the temperature in ascending 4,000 yards, unless warmed up by the condensation of the vapors in the cloud.

By the above ratio of descent of temperature, when the air has risen 1,700 yards, the temperature will have fallen between 25 and 26°, and in so doing, will, (according to Dalton's tables) after making due allowance for the increased space it occupies in ascending three miles, viz.: one-third, condense forty-four one hundred and fifteenths nearly of its vapor; which would be sufficient to heat up the air in the cloud 35°.

The expansion of the air in the cloud by the giving out of this amount of latent heat, viz.: 35,° would equal thirty-five four hundred and eightieths or one-fourteenth nearly, of its bulk, or of the space occupied by the ascending column of hot air.

Supposing now the base of the cloud to be at one mile above the earth, where the barometer may be taken as

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standing at 30 inches and the density of the air at unity, or one; at four thousand two hundred yards, its density would be .630, or one third less: or in other words the barometer would stand at 20 inches at or just above the cloud, and at 30 inches at its base: one-fourteenth of this difference would equal .71 of an inch of barometric pressure, which would express the fall of the barometer from expansion by the heat given out by the condensation of the vapors if the expansion was all in an upward direction.

On the supposition that the column of heated air or the cloud ascends to a point where the barometer would stand at 20 inches, the amount of rain which would fall would be about 1.6 inch, supposing all the vapors to be condensed and to fall on an area equal to the base of the cloud; and it would occupy about 30 minutes in falling: for when the dew point is at 65° the air contains about one seventy-seventh of its weight of vapor, and air at 80° dew point ascending on the principle of floating bodies, at the rate of 7 1-2 feet in one second, at 65°, would rise one tenth less rapidly, or at about the rate of 6 feet and 9 inches in a second.

Without doubt the Sun may and does, in the day time, aid in the development of the cumulus cloud. We learn from Mr. Wise, the Aeronaut, that the air in the base of and on the sunny side of the cloud is much warmer than at other parts, and these clouds are seldom formed in the night; but we apprehend that the *electricity given off by the condensation of the vapors* is, in many of these clouds, especially those giving rise to the tempest or tornado and the water spout, the great expansive power in their development: indeed, on no other principles but that of the convective discharge of electricity can be explained the uplifting and removal to great distances of heavy bodies, the drying up of ponds, or the phenomena noticed in the subjoined account of the tornado which has so recently occurred in Wisconsin.

"An awful tornado nearly destroyed the village of Viroqua, Wisconsin, Thursday week. One hundred and seventeen persons were killed and wounded. A correspondent of the N. Y. World gives the following particulars:—

The southern part of the village. for a strip near eighty rods in width, was swept away. Where stood handsome white houses, neat barns, and out buildings, nothing now remains but ruins. Gardens, garden fenc-

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es, orchards, grape vines, floral shubbery, well-curbs, buggies, wagons, cutters, &c., &c., were caught up, whirled, shaken, dashed to fragments, and the pieces taken for miles beyond. Never was work of destruction more rapid or complete. The track of the whirlwind is as if some mighty river had rushed over the course, leaving thousands of odd fragments strewn with liberal yet spiteful power.

Trees were torn up by the roots and thrown rods away. Roofs, sides, doors, floors, chimneys, underpinning, and furniture of houses were pounded together, broken into fragments and fairly sown over the land. Log chains were twisted apart, stoves and plow castings broken, ready for the smelter's furnace. Tree tops were loaded with clothing, bed-clothes, feather beds, carpets, chairs, harnesses, calves, sheep, dogs, cats, and poultry, dead or writhing on points of branches which had themselves been broken. Timbers have lodged in the tops of tall oaks, or, from their weight, borne saplings to the earth, and the saplings left covered with fragments of household goods as if hung out to dry. Doors, partitions, roofs, and floors of houses are found from five rods to three miles from where they belonged. Horses and cattle were killed or so badly maimed as to make their death an act of mercy. Fence rails, for ten years lying on the earth till imbedded therein, were whirled out. Stumps were torn up. Great rocks of twenty tons weight, were rolled, lifted, and broken by the mighty power.

Near the residence of John Gardner stands a tall oak rising about sixty feet from the ground. The wind whisked every leaf and small twig from the tree, leaving it looking as if dead. The house—a large white one—was taken so high in the air that it was seen above the tree tops, dashed to the ground, lifted again higher than before, whirled around and dashed roof down upon the earth a few rods from its foundation, and all but a few timbers borne away. Mrs. Gardner was in the house all the time; was spilled out in the second tumble and but slightly hurt, while an infant who was clinging fast in her arms escaped without a scratch or bruise!

In a school house were twenty-four children and a young lady teacher. The building was lifted high into the air, dashed upon the ground some distance from its foundation, again lifted about forty feet and dashed bottom up to the ground, and the fragments swept away. Eight children were killed and every other occupant badly injured. One little ten year old girl, whose thigh was lacerated and broken, when found in the fields begged the people to look for the others who were worse hurt than herself. The school house is not to be found.

Mr. Bennett was blown from his own demolished residence into a cellar near by, from which a house had been torn away. In a few seconds a little girl was thrown in by him for company. At the same time a horse was hurried in, striking Mr. Bennett and badly breaking a leg. The horse kicked and struggled to release himself from the rubbish which was "spilling" in upon the party, when Mr. Bennett tried to get a knife from his pocket that he might cut the poor animal's throat, and thus save the life of himself and the girl. At this moment a span of horses with part of their harness on were hurled in upon him and killed. The wagon to which they were attached went—the box to the west—the running gear into fragments and away over the field. The man who was in the wagon driving when the storm began was thrown like an arrow into an oak thicket thirty rods south from where he started, with fatal injuries."

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Joseph H. Abbot, of Beverly, offered a few remarks, corroborative of the theory advanced by Dr. Perkins relating to the formation of thunder clouds, from personal observations.

Rev. Mr. Spaulding, of Newburyport, said a few words, expressive of his gratification at being present and of the increasing popularity of the study of Nature.

John I. Baker, of Beverly, welcomed the Institute, and thanked them for holding a meeting in the town.

C. M. Tracy, of Lynn, explained the plants which had been collected during the day, interspersing his remarks with many pleasant allusions, especially in respect to the Laurel found in such profusion, as though "to the Manor born," and thought that the reputation of Beverly could well "rest upon her laurels."

F. W. Putnam spoke of the nest of a Red-eyed Vireo, which he had found on a small oak in a swamp. The nest contained two eggs of the Cowbunting and none of the Vireo, having evidently been deserted as soon as the Cowbunting's eggs had been laid.

Joseph D. Tucke of Beverly presented a Lieutenant's commission given by Gov. Dudley of Massachusetts to Thomas Whittridge of Beverly, April 23, 1707.

R. S. Rantoul read a few extracts from the memoir of Thomas Maxwell, a Revolutionary hero.

Rev. G. D. Wildes offered some reminiscences of the brave young men who had achieved our National Independence.

The Secretary read the following communication:—

"C. M. Tracy, of Lynn, one of our esteemed Members and Curator of Botany, delivered on Saturday last the closing lecture of a course of eight on Botany. This course gave great satisfaction and was much admired by an appreciative audience. Before separating a meeting was called to order and Professor Crosby was invited to pre-

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side. James Upton, after a few appropriate remarks, introduced the following resolutions, which were unanimously adopted:—

Resolved; That we have listened with much satisfaction to the course of lectures by Mr. C. M. Tracy, of which the concluding one has been delivered this afternoon, and that the subject has been presented by him with a discrimination of thought and felicity of language as to demand some special token of our appreciation; we therefore tender to Mr. Tracy the thanks of this audience for his very successful efforts to interest us in his favorite study, the science of Botany.

It was then *Voted*, that a notice of these lectures with a copy of this resolution be communicated at a meeting of the Essex Institute with a request that the same be entered upon the records."

On motion of the Secretary it was *Voted:* That the above communication be entered upon the records.

George W. Pousland and J. Vincent Browne Jr., of Salem, were elected Resident Members.

On motion of C. M. Tracy it was *Voted:* That the thanks of the Institute be tendered to Charles Davis Esq., Miss Sarah J. Tittle and other citizens of Beverly, for the kind interest they have manifested and the assistance they have afforded in carrying out this meeting.

Additions to the Museum and Library during April, May, and June, 1865.

TO THE NATURAL HISTORY DEPARTMENT.

By Donation.

Adams, Samuel, Hamilton. *Attacus cecropia* from Hamilton.

Allen, J. F., Salem. Larvæ and Imago of Lepidopterous Insects from the Grape vine.

Baker, David, Andover. Cast off skin of a Black Snake, 5 feet 2 inches in length.

Bennett. Mrs. A., Salem. Flying fish from Atlantic Ocean. Teeth of a Squid, Crustacean and Centipede from the East Indies.

Bolles, Rev. E. C., Portland, Me. Several Insects from Portland.

Brooks, H. M., Salem. *Attacus polyphemus* from Salem.

Brown Jr., Benj., Salem. *Papilio Turnus* from Salem.

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BUFFALO SOCIETY OF NATURAL SCIENCES, Buffalo, N. Y. Collection of 180 species of Plants from the vicinity of Buffalo.

BUTTRICK, S. B., Salem. Several Minerals.

CARLEN, SAMUEL, Salem. *Papilio Turnus* from Salem.

CARLTON, FRAZER, Salem. *Attacus cecropia* from Salem.

COLCORD, MRS. HELEN M., South Danvers. Male, female, and young Red-winged Blackbird from South Danvers.

CONWAY, MRS., Salem. Nuts from South America.

COOKE, CALEB, Salem. Collection of Plants from Zanzibar, Africa. *Ophidian* from a well in Zanzibar, Africa. Young Partridge from Salem. Parasites from the Cod, Haddock, and Skate, from Salem Harbor.

CROSBY, MRS. A., Salem. Cocoon of *Attacus cecropia* containing a grain of corn between the two layers of the cocoon.

DENSLOW, W. W., New York. 34 species of Plants, mostly collected by Audubon on his trip to the Rocky Mountains.

EAGLESTON, CAPT. J. H., Salem. Sulphur from Isl. of Formosa.

EATON, PETER E., South Danvers. Head of a Barbyroussa Hog killed on the Coast of New Zealand in 1845, by Charles H. Ingalls.

EMERTON, JAMES H., Salem. Gall flies and their parasites from Oak galls. Aquatic larvæ and larva of a Beetle from Swampscott.

FELT, JOHN G., Salem. *Meloe angusticalis* from Salem.

FLINT, C. H., Salem. *Bombus pennsylvanicus* from Salem.

HAMMOND, J. L., Salem. Musk gland of the Musk Deer from China.

HATHAWAY, BENJ. F., Salem. Chicken with four legs.

HEATH, N., Salem. Collection of Insects from Salem.

HILL, BENJ. D., South Danvers. Barnacles from the Ship "Said Bin Sultan."

HOBART, MISS, Salem. Hymenopterous Insect and a Centipede from Honolulu, Sandwich Islands.

HOOPER, NATH'L., Salem. Seeds from South America.

HUNTINGTON, GEO. C., Kelley's Island, Ohio. 25 species, 38 specimens of Fishes from Lake Erie.

IVES, J. M., Salem. Lepidopterous Insect from Salem.

IVES, J. S., Salem. Surf Duck from Salem Harbor.

JANES, JOSEPH P., Topsfield. *Attacus Luna* from Topsfield.

JONES, E. W., Salem. Collection of Insects and Spiders from Salem.

KITTREDGE, MISS, Beverly. *Attacus cecropia* from Beverly.

MACK, MISS HARRIET O., Salem. 16 species of Shells.

MARKS, J. L., Salem. Pudding stone from Long Island Sound. Breckenridge Coal from Kentucky.

MORGAN, MISS REBECCA, Salem. Twig of a Clove tree with the leaves and fruit.

NELSON, S. A., Newburyport. Minerals from Dedham, Boxford, and Newburyport.

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ORDWAY, COL. ALBERT, 24th Mass. Inf't. Specimen of *Madrepora* from Florida.

PERLEY, THOMAS W., Topsfield. *Attacus cecropia* from Topsfield.

PICKMAN, H. D., Salem. Several Fishes from Massachusetts Bay. Parasites from a Sculpin.

PORTER, E. J., Salem. 25 species of Insects from Salem.

POUSLAND, GEORGE, Salem. Skate from Salem Harbor.

PUTNAM, MRS. EBEN, Salem. Several Insects and Cells of the Mud wasp from Providence, R. I.

PUTNAM, E. L., Salem. 2 Cockroaches from Santa Cruz, British Honduras.

PUTNAM, F. W., Salem. Nest of the Red-eyed Vireo, containing two eggs of the Cow Bunting, from Beverly.

ROPES, T., Salem. Larvæ of an insect very destructive to the Tartarian Honeysuckle.

SAFFORD, JOSHUA, Salem. Malformed Claw of a Lobster.

SANBORN, FRANCIS G., Salem. Collection of Spiders from St. Louis, Mo.

SAUNDERS, MISS MARY, Salem. Eggs of a Lepidopterous Insect from an Apple tree.

SHEPARD, H. F., Salem. Hydroids and Polyzoa from Atlantic Ocean, Lat. 28°N., Long. 60°W. Collected April 1, 1865.

SHEPARD, S. A. D., Salem. Male and female Dragon flies from Salem.

SHREVE, CAPT. S. V., Salem. Malformed egg of a Hen.

SMITHSONIAN INSTITUTION, Washington, D. C. 66 species, 125 specimens of Bird's Eggs, principally from Arctic America.

SYMONDS, N. G., Salem. Embryo Skate taken from an egg found in Salem Harbor, May 1st, 1865.

TITTLE, MRS. S. J., Beverly. Spider from Beverly.

TUCK, J. D., Beverly. *Sesia pelasgus* from Beverly.

UPTON, WALTER, Salem. 2 young Hawks taken from a nest in Beverly.

VERRILL, PROF. A. E., New Haven, Ct. Collection of 46 Minerals from various localities.

WHEATLAND, DR. HENRY, Salem. Lepidopterous larva from the Birch.

WHITE, GEO. M., Salem. 3 species of Spiders from Salem.

YALE COLLEGE, New Haven, Ct. Dry specimens of *Astrophyton Agassizi*, *Asterias sp.*, *Solaster endica*, and *Solaster papposus* from Eastport, Me.; collected by Prof. Verrill, 1864. Collection of Minerals from various localities.

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TO THE HISTORICAL DEPARTMENT.

By Donation.

Adams, Samuel, Hamilton. Two Stone Chisels of the Agawam Indians found in Hamilton.

Balch, John H., Newburyport. $5 bill on the Lincoln and Kenebec Bank, dated 1806.

Bowditch, Mrs. Rebecca, Salem. Embroidered Mourning piece to the memory of Maj. Anthony Morse, 1803.

Browne, Col. Albert G., 10 inch Shell invented by Capt. James Harding, Confederate Ordnance officer, made at Charleston Arsenal and used against Iron clad Ships. Large Shell fired from Battery Putnam. 10 inch shot from Charleston. Torpedo from Charleston Harbor. 50 specimens of Confederate local scrip of various denominations. 50 cents, 1, 2, 5, 10, 50, 100, 500, dollars Confederate States currency.

Brown, J. Vincent, Salem. Ballot thrown in the 8th Congressional District of Virginia, Nov. 6, 1861.

Carpenter, D. B., U. S. Sanitary Commission. Canteen, Bullets and pieces of Shell from the Battlefield of Vicksburg.

Chapel, W. F., Salem. Relics from Gosport Navy Yard.

Chase, Geo. H., Salem. Confederate Scrip of various denominations.

Dennis, Capt. John, Beverly. Hand Grenade thrown from the fort at Port Hudson at the time of Gen. Banks' attack, July 8, 1863. Japanese Sword.

Eagleston, Capt. J. H., Salem. Water Jar from Manila.

Hammond, J. L., Salem. Priest's Robe made by the Rebels while in Nankin. Brick from the Porcelain Tower of Nankin.

Johnson, W. B. F., Salem. War Club from Feejee Islands.

Marks, J. L., Salem. Sword blade from the Plains of Abraham.

Putnam, F. W., Salem. $1 note of the Hungarian fund, dated New York, Feb. 2d, 1852.

Rust, John O., Salem. 6 inch Cannon Ball from the Rebel Steamer Merrimac.

Short, Miss Lydia Ann, Salem. Two Memorial Pitchers made during the Revolution. Chinese Umbrella.

Smith, Warren A., Chelsea. Two 10 cent Confederate Postage Stamps.

Traill, H. S., Marblehead. Pieces of the Confederate flag from Fort Pulaski.

Underwood, Joseph, Marblehead. 50 cent Confederate check on the Miss. Central R. R. Co.

Vaux, Wm. S., Philadelphia. 14 Continental bills of Pennsylvania, Delaware and Maryland, of various denominations.

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TO THE LIBRARY.

By Donation.

Andrews, Charles H. The New Whole Duty of Man, 1 vol., 8vo, London, 1788.

Andrews, Mrs. J. H. Wheaton's Enquiry into the right of search, 1 vol., 8vo, Phil., 1842. Patent office Report, agric. 1857. 1 vol., 8vo, Washington, 1858.

Boston, City of. Boston city Documents for 1864, 2vols., 8vo.

Brooklyn Mercantile Library Association. 7th Annual Report, March 30, 1865, 8vo, pamph.

Brooks, Henry M. Statutes at Large passed 2d sess. 37th cong. U. S. A., 1861—2, 8vo, pamph.; Monthly Miscellany of Western India, 1 vol., 8vo, Bombay 1850; Youth's Primer by Jona. Fisher, 1 vol., 16mo, Boston, 1818; Cowper's Task, 1 vol., 16mo, Boston, 1819; Alden's Speaker, 1 vol., 12mo, Boston, 1810; Schoberl's Persia, 1 vol., 12mo, Philadelphia, 1828; Forbes' Maps of Richmond and its Fortifications.

Browne, Albert G. F. Hoffmanni Ommium Physicomed Supplementum, 1 vol., folio, Geneva, 1769; Harrington's Occana, 1 vol., 8vo, Dublin, 1733.

Buffalo's Young Men's Association. 29th Annual Report, 8vo, pamph.

Burgess, George. Burgess' Address at the Funeral of Rt. Rev. T. C. Brownell, Jan. 17, 1865, 8vo, pamph.

Chase, George C. Friends' Review, vol. xviii, Nos. 28 to 41, incl.

Chase, George H. Richardson's Speech in convention of Virginia, April 4, 1861, 8vo, pamph., Richmond, 1862.

Chase, Mrs. George H. The Sanitary Reporter, three Numbers; The Sanitary Commission Bulletin, four Numbers; Pamphlets of Sanitary Commission, seven.

Cleveland, H. W. S., Danvers. Boston Courier from Jan. 1861, to June, 1865, 9 vols., folio; North American and United States Gazette from April, 1861, to June, 1865, folio, 5 vols., Philad.

Colcord, Mrs. H. M., South Danvers. The Pious Christian Instructed in the Catholic Church, 1 vol., 12mo, Dublin, n. d.

Curwen, George R. Spirit of Missions, 34 Nos. The Church Almanac for 1864, 16mo, pamph. The Protestant Epis. Almanac for 1864, 16mo, pamph.

Haldeman, S. S., Columbia, Penn. Notes on Wilson's Readers, 12mo, pamph., Columbia, 1864.

Hammond, J. L. Legge's Chinese Classics, vols. 1 and 2, 8vo, Hongkong, 1861.

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HANAFORD, MRS. P. A., Reading. The Martyred President by Mrs. P. A. H., 8vo, pamph. Pamphlets, twenty.

HOLDEN, N. J. Mass. Legis. Documents for 1865, 4 vols., 8vo.

HOW, HENRY, King's College, Windsor, N. S. On Magnesia Alum by Prof. How, 8vo, pamph. On Economic Geology of Nova Scotia, pt. 1, 8vo, pamph. On Mordenite, 8vo, pamph. On the Waters of the Mineral Springs of Wilmot, 8vo, pamph.

HUNT, THOMAS. A School Book in Chinese, 1 vol., 8vo. A Visiting card of Howqua.

JOHNSON, MRS. LUCY P. Monthly Journal of Amer. Unit. Association, vols. 4 and 5, 12mo, Boston, 1863—4. Fowler's English Grammar, 1 vol., 12mo, New York, 1860; The New Testament, 1 vol., 12mo, New York, 1819; Pierpont's National Reader, 1 vol., 12mo, Philad., 1854.

KIMBALL, MISS ELIZABETH. Liberator for 1864, 1 vol., folio, Boston.

KIMBALL, JAMES. Proceedings of the Supreme Council of the Northern Jurisdiction U. S. A., 8vo, pamph., Boston, 1864; Proceedings of Gr. R. A., Chapter of Mass. for 1864, 8vo, pamph.

KING, HENRY F. Scientific American, vols. xi, xii, xiii, xiv. New Series, vols. i, ii, iii, iv.; Blackwood's Edin. Magazine, 29 Nos.; Littell's Living age, 29 Nos.

LAPHAM, J. A., Milwaukie, Wis. Lapham's Maps of Wisconsin, showing the remarkable effect of the Lake in elevating the mean temperature of Jan'y., and depressing that of July, 1865.

LAYARD, E. L., Cape Town, S. Africa. Catalogue of the South African Museum, pt. 1, 16mo, pamph.

LEE, MISS HARRIET R. Collection of Hand Bills and Programmes.

LEE, HIGGINSON & Co., Boston. Rand & Avery's Specimens of Printing, 1 vol., 8vo, Boston, 1865.

LEWIS, WINSLOW, Boston. A description of the City Hospital of Boston, 8vo, pamph.

LOGAN, T. M., Sacramento, Cal. Reports of Bd. of Agric. to California State Agric. Soc'y., Jan'y. 26, 1865, 8vo, pamph.

LORD, N. J. Files of Boston Post for Jan'y., Feb. and March, 1865.

LORING, GEORGE B. Boston Post for March, April and May, 1865.

LOWE, CHARLES, Somerville. Lowe's Sermon on the death of Lincoln at Charleston, April 23, 1865, 8vo, pamph., Boston, 1865; Lowe's Discourse, June 4, 1865, on the condition and prospects of the South, 8vo, pamph, Boston, 1865.

MACK, MISS HARRIET O. "Boatswains Whistle," pub. at National Sailors' Fair in Boston, November, 1864.

MATTHEW, GEORGE F. Cupriferous Rocks of South Eastern New Brunswick, 8vo, pamph., St. John, N. B., 1865.

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NORWOOD, J. G., Columbia, Mo. Norwood's Notice of Producti &c., found in Western States, 1 vol., 4to; Norwood's Illinois Geological Survey, 8vo, pamph.; Several Pamphlets relating to University of Missouri.

ODELL, CHARLES. Eliot's Biographical Dictionary, 1 vol., 8vo, Salem, 1809.

OWEN, RICHARD, Bloomington, Ind. Owen's Key to the Geology of the Globe, 1 vol., 8vo, Nashville, 1857; Owen's 2d Report on Geology of Arkansas, 1 vol., 8vo, Phil., 1860; Owen's Report on the Geology of Indiana, 1 vol., 8vo, Indianapolis, 1862; Catalogues of Indiana University, 1863—4, 1864—5, 8vo, pamph.

PATTERSON, ROBERT, Pennsylvania. A Narrative of the Campaign in the valley of the Shenandoah, by R. Patterson, 1 vol., 8vo, Phil., 1865.

PEASE, GEORGE W. 3d Ann. Rep. U. S. Christian Commission, Jan. 1, 1865, 8vo, pamph.

PERLEY, JONATHAN. Hepworth's Address at the Starr King Lodge of Masons, April 17, 1865, 8vo, pamph.

PICKMAN, WILLIAM D. American Museum, vols. 2, 3, 6, 7, 9, 10, 11, 12. 8 vols., 8vo; Gray's How Plants Grow, 1 vol., 12mo, New York, 1859; Whelpley's Compend of History, 1 vol., 12mo, Boston, 1821; Goodrich's Early History of Virginia &c., 1 vol., 16mo, Boston, 1833; Wakefield's Botany, 1 vol., 12mo, Phil., 1818; Guide to the Lakes of Cumberland &c., 1 vol., 16mo; Ronna's Dictionnaire Francais—Italien, 1 vol., 16mo; Paris, n. d.; Spirit of the Annuals for 1830, 1 vol., 16mo, Phil., 1830; Willis' Legendary, vol. 1, 1 vol., 12mo, Boston, 1828; The Mysteries of Udolpho, 3 vols., 12mo, Phil., 1800; Goodrich's United States, 1 vol., 16mo, Boston, 1827; Memoirs of Sherburne, 1 vol., 12mo, Providence, 1831; Rambles in Italy in 1816—17, 1 vol., 8vo, Baltimore, 1818; Staunton's Embassy to China, 1 vol., 8vo, Phil., 1799; Life of Lafayette, 1 vol., 16mo, Boston, 1835; Memoir of James Jackson Jr., 1 vol., 16mo, Boston, 1836; Maitland's Narrative of the Surrender of Napoleon, 1 vol., 12mo, Boston, 1826; China and the English, 1 vol., 16mo, New York, 1835; Cathrall's Buchan, 1 vol., 8vo, Phil., 1799; Angleskay Grammatika, 1 vol., 8vo; The Children's Week, 1 vol., 12mo, Boston, 1830; Das Newe Testament Nach D. Martin Luthers, 1 vol., 12mo, Frankfort, 1830; The Saracens, 2 vols., 12mo, New York, 1810; Minot's History of the Insurrection, 1 vol., 8vo, Boston, 1810; Ostrander's Mensuration, 1 vol., 8vo, New York, 1833; History of the Trial of Warren Hastings, 1 vol., 8vo, London, 1796; Joyce's Scientific Dialogues, 3 vols., 16mo, Phil., 1825; Comstock's Chemistry, 1 vol., 12mo, Hartford, 1831; Conversations on Chemistry, 1 vol., 12mo, New Haven, 1809; Blair's Grammar of Philosophy, 1 vol., 16mo, Hartford, 1822; Fowle's Linear Drawing, 1 vol., 12mo, Boston, 1825; De Porquet, the Turning of Eng.

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Idioms into French, 1 vol., 12mo, Boston, 1833; De Porquet's Parisian Phraseology, 1 vol., 12mo, Boston, 1833; Comstock's Practical Elocution, 1 vol., 12mo, Phil., 1837; Dictionnaire des locutiones vicieuses, 1 vol., 16mo, Paris, 1813; The Traveller's Manual in Eng., Fr., Ger., and Ital., 1 vol., 16mo, Coblentz, 1847; The Holy Bible, 1 vol., 8vo, Boston, 1831; The Holy Bible, 1 vol., 16mo, Concord, 1838; Key to Murray's English Grammar, 1 vol., 12mo, Concord, 1820; Woodbridge's Geography, 1 vol., 16mo, Hartford, 1825; Adam's Latin Grammar, abridged, 1 vol., 16mo, New Haven, 1825; Putnam's Analytical Reader, 1 vol., 12mo, Dover, 1827; Sherwin's Algebra, 1 vol., 12mo, 7th ed., Boston, n. d.; Colburn's Key to Arithmetic, 1 vol., 12mo, Boston, 1829.

PUTNAM, MRS. E. A. 3 Pamphlets.

PUTNAM, F. W. and PACKARD, A. S. Putnam and Packard's Notes on the Humble Bees and their parasites, 8vo, pamph.

ROBERTS, WILLIAM S. Asiatic Journal, vol. 1, 8vo; Stewart's History of the Discovery of America, 1 vol., 8vo. Pamphlets, 3.

SAFFORD, MRS. JOSHUA. Washington's Farewell Address, 1 vol., 24mo, Newburyport, 1812.

SALISBURY, J. H.. Cleveland, Ohio. Catalogue of the Charity Hospital Medical College of Cleveland, Ohio, 8vo, pamph, Cleveland, 1865.

SHAEFER, P. W., Pottsville, Pa. Maps of the Anthracite Collieries and the Pottsville, Lehigh, Mahonoy and Shamokin Coal Basins in Penn., by P. W. Shaefer, 1859.

STIMPSON, WILLIAM, Chicago, Ill. Stimpson's Synopsis of Marine Invertebrata, 8vo, pamph.; Stimpson's Malacoölogical Notes, No. 1.

STONE, B. W. Memorandum in relation to the Gold Mines of the Chaudiere in Canada, 8vo, pamph.; Circular of the Dawn Petroleum Company.

TRASK, J. H., Wenham. Reports of Selectmen and School Committee of Wenham, March, 1865, 8vo, pamph.

TUCKER, W. P. Bishop Burgess' 5th Charge, July 9, 1862, 8vo, pamph.

WARD, CHARLES. Journal of Commerce Jr., New York; Essex Statesman, Salem.

WATERS, J. LINTON, Chicago, Ill. Receipts and Expenditures of Chicago, from April 1, 1864 to April 1, 1865, 8vo, pamph; A Guide to Illinois Central R. Road lands, 8vo, pamph., Chicago, 1865.

WHEATLAND, HENRY. The Olive and the Pine, 12mo, 1 vol., Boston, 1859; Record of an Obscure Man, 1 vol., 12mo, Boston, 1861; Success in Life, The Mechanic, by Mrs. L. C. Tuthill, 1 vol., 12mo. New York, 1860.

WILDES, J. H., San Francisco, Cal. 12th Annual Report of Mercantile Library Association of San Francisco, 8vo, pamph.; Views of

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the works of the Gould & Curry Silver Mining Company, Virginia City, N. T., 1 vol., 4to; Life of Joseph Vico, a Japanese who was rescued by the "Fennimore Cooper," an account of his travels in the United States, in the Japanese Language, 1 vol., 8vo.

WILLSON, E. B. Willson's Review of Ecclesiastical Proceedings in Brooklyn, Conn., 8vo, pamph., Worcester, 1818; Adam's Historical Discourse at Templeton, 8vo, pamph., Boston, 1857; Willard's Historical Discourse at Deerfield, 8vo, pamph., Greenfield, 1858.

YOUNG, S. J., Librarian of Bowdoin College. Catalogue of Bowdoin College, 1865, 8vo, pamph.

BY EXCHANGE.

AMERICAN ACADEMY OF ARTS AND SCIENCE. Proceedings, vol. ix., pages 341 to 364 incl.

AMERICAN ANTIQUARIAN SOCIETY. Proceedings of Special Meeting, Jan. 17, 1865, on the Death of E. Everett. 8vo, pamph.

AMERICAN PHILOSOPHICAL SOCIETY. Proc'd., vol. i, pages 1 to 48.

BOSTON SOCIETY OF NATURAL HISTORY. Proceedings, vol. ix., pages 305 to 375.

CANADIAN INSTITUTE. The Canadian Journal for March and May, 1865.

EDITORS. Savannah Daily Herald; North American Review; Historical Magazine; American Journal of Science; Florida Union; Home Evangelist; Salem Observer; Lynn Weekly Reporter; Essex Banner, (Haverhill); Haverhill Gazette; Lawrence American.

FIRELANDS HISTORICAL SOCIETY. The Firelands Pioneer, vol. vi., 8vo, Sandusky, 1865.

IOWA HISTORICAL SOCIETY. The Annals of Iowa for April, 1865.

MONTREAL SOCIETY OF NATURAL HISTORY. The Canadian Naturalist and Geologist for February, April and June, 1865.

MUSEUM OF COMPARATIVE ZOÖLOGY AT CAMBRIDGE. Annual Report of the Trustees for 1864, 8vo, pamph.

NEW ENGLAND HISTORIC-GENEALOGICAL SOCIETY. N. E. Hist. Gen. Register for Jan. and April, 1865.

PENNSYLVANIA HISTORICAL SOCIETY. Resolutions on President Lincoln, April 27, 1865, 8vo, pamph.

PHILADELPHIA ACADEMY OF NATURAL SCIENCES. Proceedings for Jan., Feb. and March, 1865.

TRÜBNER & Co., London. Trübner's Amer. and Oriental Literary Record, Nos. 1 and 2.

ZOÖLOGISCHE GESELLSCHAFT, Frankfurt a. m. Der Zoölogische Garten, vol. 5, Nos. 7 to 12 incl.

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MONDAY, JULY 3. Regular meeting.

Henry F. King in the chair.

William H. Osgood and Joseph C. Foster, of Salem; Robert R. Endicott and George Roundy, of Beverly, were elected Resident Members.

THURSDAY, JULY 13. Field meeting at Reading.

The first Field meeting held by the Institute beyond the limits of Essex County took place in the town of Reading. The party from Salem leaving in the ten A. M. train and arriving at Reading at about eleven o'clock.

Reading is an attractive looking town, containing many hills and groves, among which are pleasant drives and walks. This town was many years ago a part of Lynn. It also included South and North Reading, which were afterwards set off in response to local requirements. On arrival, the company immediately repaired to the chapel of the old South Congregational Church, where the refreshment baskets were deposited and Vice President Goodell announced the programme for the day. As the time was limited, no very long rambles could be taken, and the few hours were passed in examining the garden of Mr. Amos Cummings situated on "Prospect Hill;" the nurseries of Mr. J. W. Manning; the old burial ground where many interesting and quaint epitaphs were to be seen; and by a trip to the pond and adjacent fields and groves.

About one o'clock the party again assembled in the Chapel, and, after partaking of refreshment, adjourned to the Church where the regular meeting was organized with

Vice President GOODELL in the chair.

The Rev. Wm. Barrows, pastor of the society in whose church the meeting was held, welcomed the Essex Institute to the town of Reading, alluding to the fact that this town

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was once a part of Lynn, and was then known as "Lynn Village," and, therefore, properly within the range of the researches of the Institute.

The Chairman responded, thanking the people of the town for the interest they had manifested this day and for their successful efforts to make the visit of the Institute a pleasant one.

Rev. W. W. Hayward, of South Reading, read an original hymn, written by a resident of Reading, which was sung by the choir of the church.

The records of the last meeting were read, and donations to the Library and Museum were announced.

Letters were announced from:

E. W. Blatchford, Chicago, Ill.; Chas. J. Sprague, Boston; Joseph N. Howe, Boston; Prof. C. F. Chandler, Columbia College; Thomas Barlow, Canastota, N. Y.; J. Kirkpatrick, Cleveland, Ohio; Prof. J. C. Holmes, Lynn; Dr. A. Kellogg, San Francisco, Cal.; J. J. Haagensen, St. Thomas, W. I.; Dr. Frederick Brendel, Peoria, Ill.; Geo. W. Peck, New York; Prof. A. Winchell, Ann Arbor, Mich.; Chas. Stodder, Boston; G. Hastings Grant, New York, relating to the publications: Dr. Wm. Stimpson, Corr. Sect., Chicago Acad. Nat. Science; Prof. Theo. Gill, Smithsonian Institution; Prof. S. F. Baird, Smithsonian Institution; E. A. Samuels, State Cabinet; E. S. Morse, Gorham, Me.; Rev. E. C. Bolles, Portland, Me.; Prof. J. G. Norwood, Missouri State University; Dr. A. S. Packard, Jr., Brunswick, Me.; Prof. P. A. Chadbourn, William's College; G. A. Boardman, Milltown, Me.; Dr. Daniel Clark, Flint, Mich.; Prof. D. S. Sheldon, Griswold College, Davenport, Iowa; Tryon Reakirt, Philadelphia; Henry L. Hotchkiss, New Haven, Conn.; Mrs. P. A. Hanaford, Reading; A. J. Archer, Salem, on business, and acknowledging the receipt of specimens: Prof. Richard Owen, New Harmony, Ind.; Prof. E. D. Cope, Haverford College, Pa., accepting membership: Maine Historical Society; Albany Institute, acknowledging receipt of Publications.

A communication on the Geology of Reading by Mr. L. B. Pillsbury of Hopkinton, formerly principal of the High School in Reading, was read by the chair.

John M. Ives, of Salem, spoke of Birds, particularly of the Swallows, describing the habits of the various species

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known in this vicinity. He also alluded to the habits of the Robin, Cow Bunting, Wren, Cherry Bird and Canada Goose, relating several curious anecdotes illustrative of the peculiarities of a number of the species.

Dr. G. B. Loring, in connection with Mr. Ives' remarks, spoke of the habits of the Eaves Swallows, a number of which had built their nests on his barn. Dr. Loring also claimed to be something of a Reading man, having once had charge of a school in that town, and related some amusing experiences connected with his professional duties. His compensation was $15 per month and "board round." He said that Rev. Dr. Flint, Hon. Amos Kendall and Rev. Cyrus Pierce had also been school teachers in the town. He related an anecdote of Mr. Kendall, who, while Post Master General under Jackson's Administration, had astonished some Reading politicians who desired a change of location in the town post office, by asking why the petition did not bear the signatures of certain leading men whom he named. "What!" said they, "do you know the name of every man in the United States?" The truth was Mr. Kendall remembered the names of some of the citizens who had been his friends, while a school teacher, at the age of sixteen.

F. W. Putnam, of Salem, made a few remarks on the geology of the town, called forth by Mr. Pillsbury's paper, and then proceeded to describe the few insects and fishes which had been collected during the morning.

C. P. Judd, of Reading, occupied a few moments, quite acceptably, with some interesting reminiscences of the early history of the town.

Ezra F. Newhall, of Salem, was elected a Resident Member.

On motion of Dr. Loring it was *Voted:* That the thanks of the Essex Institute be presented to the Proprietors of the old South Church of Reading, for the use of their

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house; and to the Rev. W. Barrows; the members of his society; and other friends in Reading, for their kind attention to the members of the Institute during the day.

After the singing of "America" by the choir and a benediction by the Pastor, the meeting adjourned in time for the cars for home, and all were well pleased with their visit to the town and the hospitality of its inhabitants.

At the depot, the signal master called the attention of a number of the members to a pair of Blue Birds which had built a nest in one of the signal balls, from which a piece of the canvas had been torn. These birds, after raising one brood of young, had made another nest, by the side of the first, in which they had laid the eggs for a second brood. The signal ball, in which the nests were made, was lowered and hoisted about fifty times a day. The birds flying out as soon as the ball commenced its descent, and, alighting upon the fence near by, would wait patiently for it to be hoisted again, when they would at once return to their nest.

MONDAY, JULY 17. Regular meeting.

Vice President Goodell in the chair.

William E. Doggett, of Swampscott and Sarah B. Endicott, of Salem, were elected Resident Members.

The Secretary stated that the portrait of Gov. John Leverett, which was sent, at the request of Leverett Saltonstall Esq., to Mr. Howarth of Boston, to be cleaned and restored, had been returned to the Institute in excellent condition, without cost to the Society.

On motion of Judge Waters, it was *Voted:* That a committee be appointed to tender to L. Saltonstall Esq., of Newton, the sincere thanks of the Essex Institute for this mark of his esteem and liberality in behalf of the Institute.

Messrs. J. G. Waters, H. Wheatland and S. B. Buttrick were appointed on the committee.

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THURSDAY, JULY 27. Field meeting at Georgetown.

The Fourth Field meeting of the season was held this day at Georgetown.

Georgetown is not, distinctively, an old town. Its antiquity is entirely borrowed from the interesting town of Rowley, of which, like Boxford and Bradford, it was formerly a part, having enjoyed an independent existence among the family of towns only since the year 1838, and consequently being a younger sister of the towns last named. It was known, before the separation, as "New Rowley." The original post office box, not over three or four feet long, through which the New Rowley mail passed, is still in existence, and may be seen at the native wine establishment of Messrs. M. Carter & Son. It bears the following painted inscription: "New Rowley and Georgetown Post Office, established March 17, 1824; Benj. Little, P. M. First quarterly return, $7.32. Last quarterly return, June 1, 1845, $117.96. Whole amount collected, $5,373.63."

Georgetown appears to be one of the most active and spirited of our country towns, where attention is given not only to farming, but, also, a considerable share of the capital of its men of means is devoted to the manufacture of shoes, giving steady employment to many. The crops in the town look flourishing and bid fair to be plentiful. Apples will be scarce here as elsewhere in New England; but berries, cheapest of all fruits, abound.

On the arrival of the party a cordial welcome was tendered by O. B. Tenney Esq. Chairman of the Selectmen, who offered the hospitalities of the place, and called attention to the various points of interest in the town. Numerous vehicles were also in waiting to convey the party to the various objects of interest. Among the places visited by the several parties, were the "Old Lull House,"

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which is situated about two and a half miles from the village on the Newburyport road. It is owned by Mr. Gorham D. Tenney, who is proprietor of the adjoining farm, which comprises two or three hundred acres. Mr. Tenney is the son of Capt. Gorham P. Tenney, whose wife was the daughter of Dudley Lull, whose name still imparts a designation to the old house. When, in 1690, the war was being conducted against the French in Canada, the Indians became troublesome in the Provinces, and on Oct. 23, 1692, this old house, which is in that part of the Byfield Parish included in the town of Georgetown, was the scene of a massacre of which an account may be found in Gage's History of Rowley. At that time it was occupied by a Mr. Goodrich who, with his wife and two daughters, while engaged in his family prayers, on Sabbath evening, were killed by the Indians. Another daughter, named Deborah, aged seven years, was taken captive, but was redeemed the next Spring, at the expense of the Province. She died in Beverly, as appears by the records of the First Church in that town, where the entry reads, "Buryed, March 28, 1774, Deborah Duty, aged 88, a widow." Those who were killed are said to have been buried in one grave a few rods to the east of the house. The exact spot, as located by tradition, was pointed out.

Mr. Tenney, the present owner, was very courteous and attentive to those who visited his place, and, besides proffering acceptable comforts, exhibited, at the farmhouse which he occupies, some good specimens of Indian relics, such as a pestle, gouge, axe, and arrow-heads; all having been found upon his farm, which was evidently an Indian resort in the olden time. He conducted the party through the old house, which is now very dilapidated and of course unoccupied. It has undoubtedly undergone some alterations since the day when Mr. Goodrich and his family

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were murdered, but the huge fire-places, clay-cemented chimneys, and broad and ponderous beams, betoken decided antiquity.

The famous octagonal barn of Mr. Samuel Littell was visited by a large party. This barn is said to be the largest in Essex County, being about eighty feet in diameter, each of the octagonal sides being about thirty-two feet. It has two floors in addition to the basement, and is so constructed with reference to the rising ground upon which it is built, that upon each floor there is an entrance from the ground. Situated upon a natural eminence, the view from the top of it is very extensive. Here may be seen Pentucket Pond, not far distant; Rock Pond, which flows into it; Haverhill, Groveland and Bradford; the ocean far away, and a vast extent of surrounding country, including distant eminences, among which several peaks of the White Mountains could be distinctly traced.

"Bald Pate," the highest hill in Essex County, being 392 feet above the level of the sea, and the "Ridges" were visited, as well as the Burial Grounds and other places of interest, among which was the Vineyard of Messrs. Carter & Son, who carry on a large manufactory of native wines.

The Mineral Point Mine on Atwood's Hill, was also visited. This mine yields an inexhaustible quantity of brown ochre, with which a large number of the houses in Georgetown and vicinity are painted, and which has been quite an article of export.

Another party made an excursion to the pond where a number of botanical and zoölogical specimens were collected.

Soon after one o'clock nearly all the parties had returned from their rambles, and assembled once more at the Town Hall, where, in addition to the refreshments brought by the company, the Georgetown people had liberally con-

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tributed to the entertainment. The hospitalities having been duly partaken of, the meeting for discussion was then held, commencing at half past two o'clock.

Dr. G. B. LORING, Chairman of the Field meeting Committee, in the chair.

The Chairman opened the meeting with remarks relating to Georgetown, of an historical character, alluding to its ecclesiastical controversies; some witchcraft experiences; and the character of some of its public men.

After reading the records of the last meeting and the lists of donations to the Library and Museum, letters were announced as received since the last meeting from:

Prof. J. Wyman, Cambridge; Prof. A. Winchell, Ann Arbor, Mich.; Frank Stratton, Natick, Mass.; T. A. Cheney, Havana, N. Y.; T. Bland, New York; E. S. Morse, Gorham, Me.; A. Hyatt, Baltimore, Md.; I. C. Martindale, Byberry, Pa.; Prof. L. Lesquereux, Columbus, Ohio; Prof. A. N. Prentiss, Lansing, Mich.; E. W. Blatchford, Chicago, Ill.; Thure Kumlien, Bussyville, Wis.; A. Agassiz, Cambridge, Mass.; B. P. Mann, Concord, Mass.; Noble, Brothers & Co., New York, relating to the publications: Redwood Library and Athenæum; Maine Historical Society, acknowledging the receipt of publications: Isaac M. Long, Salem; Col. Albert Ordway, Richmond, Va., transmitting specimens to the Museum: Prof. J. G. Norwood, Columbia, Mo.; Dr. T. A. Tellkampf, New York; Wm. Couper, Quebec, Canada; W. S. O. Brinckloe, Philadelphia, Pa.; Prof. Richard Owen, New Harmony, Ind.; Rand & Avery, Boston; Lowell Bleachery; New York State Library; Joshua P. Haskell, Marblehead, Mass.; J. R. Newhall, Lynn, Mass.; J. K. Wiggin, Boston; Lyceum of Natural History of New York, on business matters.

James P. Cooke and David P. Carpenter, of Salem, were elected Resident Members.

Mr. C. M. Tracy, of Lynn, was called upon by the chair, and responded in his usual happy and ready manner, giving some account of his observations during the day, and mentioned some of the principal plants collected. Among these were the Orchis, Buttonbush, Cardinal Flower,

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Clethra, Asters, Golden Rods, and other varieties. In this connection some discussion arose in reference to the parasitical character of the Indian Pipe.

C. L. Flint, Esq., Secretary of the State Board of Agriculture, being called upon, made some general remarks favorable to scientific research and commending the objects of the Institute.

Rev. J. L. Sibley, Librarian of Harvard College, followed, speaking of the importance of preserving old pamphlets and papers, as having an important bearing, aside from any historical value, in settling questions involving the rights of property. He mentioned several instances which had come under his observation, and said the Institute was doing a valuable work in this connection, besides exerting an influence that was felt all over the country.

Capt. Alpheus Hyatt, of Baltimore, made some remarks with regard to the general sac like plan of the Animal Kingdom, defining the Radiata as radiated sacs, the Articulata as articulated sacs, the Mollusca as the simple typical sac and the Vertebrata as sacs divided internally into two cavities. Capt. Hyatt adduced specimens of *Paludicella* and *Fredericella*, found during the forenoon ramble, as proofs of the specialization of the sac among the Mollusca, and gave in detail their anatomical and physiological peculiarities.

Mr. F. W. Putnam, of Salem, gave a brief abstract of his day's observations, and enlarged upon the habits of the gall fly, specimens of which he produced at the meeting.

Capt. J. G. Barnes, while he made no claim to being a naturalist, said he had no doubt Georgetown could present much that was worthy the attention of a careful scientific observer. He said that during the past four years we have been making history very fast; and he looked with local pride upon what had been done in his state and town for

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the maintenance of the union of the States, and suggested that it was the duty of this historical society to gather all facts and memorials tending to elucidate the history of this period.

Mr. A. C. Goodell, of Salem, gave some curious facts in regard to the names of several towns in the vicinity, and closed his remarks by reading a poem written for the occasion by a Salem lady.

Richard Tenney, Esq., Postmaster of Georgetown, gave some facts in the history of the town, especially in relation to its incorporation as a distinct municipality.

Mr. John Preston, of Georgetown, presented a leaf from a magnolia planted by George Washington at Mount Vernon.

A resolution of thanks, offered by Mr. Walton and seconded by Mr. Upham, was passed to Messrs. O. B. Tenney and Sherman Nelson, Selectmen; Maj. Moses Tenney, Capt. Barnes, Lieut. Wildes; Messrs. Stephen Osgood, John Preston, John Bradstreet, Isaac Wilson, Edmund Bailey, Chas. Carter, Samuel Wadleigh, Geo. W. Boynton, Jos. Folsom, Richard Tenney, Geo. Harnden, Wm. Horner, Robert Coker, Gorham D. Tenney, and other citizens of Georgetown, for their liberal and successful efforts in making the meeting a pleasant and instructive one.

On returning to the depot, at the close of the meeting, Mr. W. S. Horner, the depot master, displayed a few of his many Indian relics.

WEDNESDAY, AUGUST 9. Quarterly meeting.

N. WESTON, JR., in the chair.

On motion of F. W. Putnam, it was *Voted:* That the following be added as a final clause to Chapter IV of the By-Laws.

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"Every facility in the power of the Superintendent, consistent with the welfare of the specimens, shall be offered to persons visiting the Museum for the purpose of study and comparison."

D. B. Hagar, J. Leonard Hammond and Elizabeth A. Putnam, of Salem, were elected Resident Members.

FRIDAY, AUGUST 18. Field meeting at North Andover.

The fifth Field meeting of the season was held at North Andover this day. About three hundred persons arrived in the train from Salem and assembled at the "First Church" before separating into small parties to visit the special objects of interest to each.

The zoölogists sought the brooks and streams and found many specimens amply rewarding them for their search; the botanists the woods and meadows for various flowers; the antiquarians for the relics of olden time.

This township was first settled in 1634. In the same year the following order of the court was issued respecting the land in Andover:

"It is ordered that the land about Cochichewick shall be reserved for an inland plantation, and whosoever will go to inhabit there shall have three years immunity from all taxes, levies, public charges, and services whatever, military discipline only excepted."

The land is uneven, rising into large hills, affording fine and delightful prospects and scenery. Dr. Dwight, in his travels, some sixty or seventy years since, says of the North parish of Andover: "Its surface is elegantly undulating, and its soil in an eminent degree fertile. The meadows are numerous, large, and of the first quality. The groves, charmingly interspersed, are tall and thrifty. The landscape, everywhere varied, neat and cheerful, is also everywhere rich." Hither many come from the crowded city to

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enjoy the recreation of the country; and where can a better place be found than this well known Summer resort?

The Church was founded in 1645 and consequently is one of the oldest in the Connty. For seventy years the desk was very acceptably filled by the two Barnards—the Rev. Thomas, and his son the Rev. John—and "during their ministry the people enjoyed a series of peace and improvement beyond what is common." The second Barnard died 14th of June, 1758, aged 68 years; he left two sons, both distinguished clergymen. One was the Rev. Thomas Barnard of Newbury, afterwards of the First Church in Salem, and father of the Rev. Thomas Barnard, D. D., first minister of the North Church in Salem; the other was Rev. Edward Barnard of Haverhill, whose portrait by Copley is in the possession of the Essex Institute.

The Great Pond, so called, is a fine, clear basin of water, containing obcut 450 acres, and is well stocked with fish. The outlet, known as Cochichewick brook, furnishes the power of several woolen mills, some of which belong to the estate of the late Eben Sutton, Esq., of South Danvers. This was visited by many, and from the adjacent hills fine views of the Merrimack, the city of Lawrence, and other places, were enjoyed.

The afternoon session was called to order at three o'clock.

Dr. George B. Loring in the chair.

The records of the last meeting were read. Donations to the Library and Cabinets announced.

Letters were read from:

Rev. Samuel Lockwood, Keyport, N. J.; Edward A. Brigham, Boston; C. F. Austin, Closter, N. Y.; The Abbé Brunet, Quebec, Canada; E. S. Morse, Gorham, Me.; Prof. James Hall, Albany, N. Y.; James Lewis, Mohawk, N. Y.; Dr. Julius Homberger, New York; Henry White, New Haven, Conn.; J. H. Stickney, Baltimore, Md.; S. S. Par-

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vin of the Iowa Historical Society; Dr. L. R. Stone, U. S. V., Harper's Ferry, Va.; Prof. Jonathan Pearson, Schenectady, N. Y., relating to the publications: Prof. Richard Owen, New Harmony, Ind.; W. H. Pease, Honolulu, S. I.; S. Jillson, Feltonville, Mass.; S. H. Scudder, Sect. Boston Soc. Nat. Hist.; Dr. A. S. Packard, Jr., Brunswick, Me.; Capt. Alpheus Hyatt, Boston; James R. Newhall, Lynn, Mass.; Mrs. P. A. Hanaford, Reading, Mass.; J. Prescott, Supt. Eastern R. R.; William Merritt, Supt. Boston & Maine R. R.; H. J. Cross, Salem, relating to the collection of specimens and business matters; Albany Institute; New York Historical Society, acknowledging the receipt of publications: Mrs. Sarah B. Endicott, accepting membership.

E. W. Buswell, of Malden; James Hill, Henry. P Hendrick, William Haskell, A. T. Mosman, of Beverly, and Martha G. Wheatland, of Salem, were elected Resident Members.

On the table were three beautiful and very finely executed paintings of flowers by Miss Eliza B. Davis, for several years a resident of Salem, a lady long and very favorably known to our citizens as zealously devoted to this beautiful art.

The Chair made some remarks upon the early history of Andover, alluding to several incidents connected with the first settlers and their immediate descendants. He spoke of the Phillips family, and paid a high eulogium to several of its members who have been great benefactors to the cause of education, in the liberal endowments to several seminaries of learning, which bear the honored name of Phillips. He also spoke of Stevens, the founder of one of the woolen mills on the Cochichewick stream, as one of the pioneers in this branch of our domestic industry. The old Franklin Academy was mentioned, incorporated in 1801, and which had been highly beneficial to the parish and to the youth who have enjoyed its advantages equally under the superintendence of Mr. Simeon Putnam, and of Mr. Cyrus Peirce, the experienced and faithful teacher, and the first teacher of a Normal School in this State. In this

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connection he alluded to the late Gen. I. I. Stevens, who fell fighting for the cause of his country in the recent rebellion, and who displayed in boyhood and youth the same intrepidity and courage which marked his later career.

The Chairman, after some additional remarks of a similar tenor, called upon Mr. John M. Ives, of Salem, who continued his observations upon the habits of many of our birds, which he had commenced at the meeting in Reading, a few weeks since, with especial reference to the migration of several species.

The Chairman stated that Andover had long been noted for its large trees, mentioning a large elm transplanted by Mr. Jonathan Frye in 1725, and called upon Mr. Goodell to give some account of what he had seen during the day.

Mr. A. C. Goodell, Jr., replied giving an interesting account of the large elm tree which he visited, and which measures, two feet from the ground, about thirty five feet in circumference. He then spoke of his ride around the Great Pond, above alluded to, and the view from some of the high hills, concluding by mentioning some interesting reminiscences of the early history of Andover. The land, including Andover, Lawrence, &c., was purchased of Cutshamache, the Sagamore of Massachusetts, for twenty six dollars, sixty four cents, and a coat. The town was incorporated in 1646 by the name of Andover, receiving that name from Andover in Hampshire, England, whence many of the settlers came.

Mr. F. W. Putnam spoke of the Striped Snake and other species which were found in this vicinity. Referring to the snake bite case in Lowell, Mr. Putnam said he had himself been bitten by the striped snake and had never experienced any ill effects, and he thought that the effects said to have followed the bite in the Lowell case were wholly due to fear, as there was no venomous fang in the striped

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snake. He then alluded to the fishes, giving some account of the minnows and pointed out the differences between these and those found in salt or brackish water.

Mr. E. G. Parker, of Groveland, asked some questions respecting the Tent Caterpillar, stating that from some happy but unaccountable cause all the caterpillars of this species, in this vicinity, had not had the strength to complete their cocoons, or had died soon after forming them. Considerable discussion upon the Tent Caterpillar and other injurious insects followed, participated in by Messrs. Parker, Ives, Putnam and the Chair.

The Secretary announced that Rev. Stillman Barden, a member of the Field Meeting Committee, and an ardent friend of the Institute, who had felt a great interest in, and had been a constant attendant upon these meetings, had died at Rockport since the last meeting; and upon his motion a committee was appointed to prepare suitable testimonials of respect to his memory and worth.

Mr. C. Davis, of Beverly, offered the following vote, which was unanimously adopted:

Voted; That the thanks of the Institute are due to the proprietors of the First Church in North Andover for the use of their house; to the members of "Cochichewick Engine Co., No. 2", for the use of their building; to Messrs. Moses T. Stevens, Otis Bailey, W. P. Phillips, John Bertram, James B. Curwen, Matthew Poor, I. O. Loring, Mrs. Nath'l Stevens, and other citizens and temporary residents of North Andover, for their kind attentions during the day.

The meeting then adjourned.

WEDNESDAY, AUGUST 23. Adjourned Regular meeting. Judge Waters in the chair.

Prof. J. G. Norwood, of Columbia, Mo., was elected a Corresponding member.

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THURSDAY, SEPTEMBER 7. Field meeting at Newburyport.

The sixth and last Field Meeting of the season took place this day. About three hundred and seventy five persons attended, the larger portion proceeding over the Eastern Railroad to Newburyport, and thence down the Merrimack to Salisbury Point. The party was so large that, in addition to the passenger barge usually employed, it was found necessary to charter a schooner, both being taken in tow by a powerful little tug boat called the "Thurlow Weed". The trip down the river, some three miles, occupied about half an hour, and upon arriving at the Point, the barge and schooner were run directly upon the sand beach, and the company landed without any difficulty. Here nearly two hours were spent, and a few improved the time by inspecting Fort Nichols, and rambling over Salisbury Beach proper, which extends several miles along the ocean side, and is one of the finest beaches on the coast. The heat was so intense, however, that but a small number improved the opportunity. The fort mounts ten or twelve guns. The parapet already shows signs of disintegration, the effect, probably, of the severe drought, and of the sun's rays which concentrate upon the sand heaps with overpowering intensity. There were several tents in the vicinity, occupied by "camping out" parties from up the river.

Returning to Newburyport, the company partook of the usual picnic dinner in the City Hall, and afterwards had an opportunity to visit the many places of interest in the city, including the Horton Memorial Chapel, the Whitefield Church, the Copley Portraits, the Public Library, and other objects of note heretofore described.

At three o'clock, the afternoon meeting was organized in the City Hall.

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Vice President A. C. Goodell, Jr., in the chair.

The records of the preceding meeting were read. Donations were announced to the Museum and Library.

Letters were read from the following:

S. H. Scudder, Sect. Boston Soc. Nat. Hist.; H. A. Bellows, Concord, N. H.; A. W. Dodge, Hamilton; Dr. A. S. Packard, Jr., Boston; C. G. Brewster, Boston; H. A. Purdie, Boston; Samuel Jillson, Feltonville, Mass.; Prof. Joseph Henry, Sect. Smithsonian Institution; Prof. Theo. Gill, Smithsonian Institution; B. Westermann & Co., New York; Ezra Cleaves, Beverly; Mrs. K. N. Doggett, Chicago, Ill.; Hugh Wilson, Salem; A. Lackey, Marblehead; Mrs. P. A. Hanaford, Reading; I. P. Langworthy, Boston; Rev. Geo. D. Wildes, Salem; Paul J. Beckford, Salisbury, relating to the forwarding of specimens and general business: W. M. Hunting, Fairfield, N. Y.; E. S. Morse, Gorham, Me.; Prof. O. P. Hubbard, Dartmouth College; Prof. S. F. Baird, Smithsonian Institution; Dr. Julius Homberger, New York; Prof. E. A. Verrill, Norway, Me.; Capt. Alpheus Hyatt, Gorham, Me.; H. B. Rice, Boston; Surgeon B. G. Wilder, 55th Mass. Vols.; N. S. Shaler, Cambridge; W. Bower, New York; A. C. Goodell, Jr., Salem; W. A. Smith, Worcester, relating to the publications: James P. Kimball, New York, accepting membership.

Joseph P. Cloutman, of Salem, was elected a Resident Member.

Mr. F. W. Putnam, of Salem, was called on for an account of the forenoon ramble. The various specimens that had been collected were displayed on the table, and Mr. Putnam took them up in order. He first showed a fish bone, and explained how from one bone, hair, tooth or scale the character of the living animal could be determined, the analysis in the present case proving the specimen to be part of the jaw of the monk fish (*Lophius*). He next showed several specimens of sandlances (*Ammodytes*), which bury themselves in the sand, when thrown up by the waves, and remain till the next tide allows them to return to their native element. These fishes often lie at the bottom of the water, apparently dead, but on being disturbed revive and become as active as ever. A bottle of

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minnows was next exhibited and their characteristics explained. The next object in order was the skull of a cat, picked up on the beach, which was interesting from the very extreme age indicated by the teeth, many of which had dropped out, and the cavities become closed. The horse-shoe, or king crab, was next taken up. These were not the animals themselves, but only the shells, the tenants having vacated on their quarters becoming too close for them, a new and larger shell being secreted in a short time. They also cast out the lining of their stomachs. These animals are among the lowest of their class, approaching the fossil trilobite. The sand flea was also referred to as a proper crustacean. The sea urchin was exhibited as a specimen of the radiates, and shown to be in its structure closely allied to the starfish. A black body about two inches long, with prongs projecting from the corners, and which is popularly supposed to be a seaweed bladder, was explained to be the egg case of a skate. The fish attains its perfect form in this case, being supplied with water during its entire growth by means of the four tubes or prongs.

Dr. Henry C. Perkins, of Newburyport, was next called on. He said he came to learn, not to teach, but still would not be selfish. He thought the society had made a collection of all the specimens the waters of this region afforded. He once had a dredge made, and used for several years by a boatman, for the purpose of fishing up, if possible, some new species not found on the shore, but succeeded in finding only one—an arctic shell. He had been interested in watching an excavation in order to study the various strata and other objects of interest. The hill where the observatory stood during the last war, had changed from a northwest to a northeast slope. The sand resembles the Plum Island sand, and at the present time the drought had reach-

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ed five feet, that being the point where the first indications of moisture were found. When the "James Mills" excavated the hill on the turnpike for a reservoir, they found at a depth of five feet pine logs three feet in diameter at a locality known by tradition as the "Pine Swamp." Lower still, stratified sand was found, and five feet lower, a trunk of a tree within one foot of water. In searching for organic remains he had found gravel cemented to larger stones by lime which had apparently percolated through the strata above from shells. He also referred to the change in the channel in the river, and to the storm which cut off a mile of Salisbury beach, making a channel for the largest ships.

Rev. A. E. P. Perkins, of Ware, made some remarks on geology. He thought geologists were often mistaken in deducing the age of formations, for, owing to causes which we did not understand, the alluvial formation often accumulated in a hundred years as much, as at the slow rates sometimes observed, would indicate ten thousand years. In his native town, not yet a century old, a certain location was known as the beaver dam though no traces of the dam were found or known to the present generation, till, on digging a ditch, it was discovered four feet below the surface, which proved that that depth of alluvium had accumulated in a hundred years.

He then made some remarks on the migrations of birds. He included in this term not only the annual migrations but the permanent change of habitat. Birds often appeared in great numbers in a region to which they had previously been strangers; and, on the other hand, sometimes disappeared entirely from their accustomed haunts. There were many birds in our woods which not one man in ten had ever seen, whose song could be detected by an experienced ear, but never heard by the chance passer by. He instanced the Indigo bird as an example.

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Hon. Asahel Huntington, of Salem, gave an interesting reminiscence of Newburyport, and his early acquaintance with many of the prominent divines, physicians and lawyers. He highly eulogized Miss Gould, the poetess, and her father, Capt. Benjamin Gould, who took part in the Revolution and was wounded at the battle of Lexington. He built the house in which Mr. H. was born, and the first rudiments of his education he received in a school taught by a sister of the poetess. The first of Miss Gould's famous series of epitaphs was written for him, at his suggestion, in reply to her assertion that he would kill himself smoking. She complied, and wrote the epitaph off hand, together with some half dozen others the same evening. This was her first attempt at poetry.

Col. Eben F. Stone, of Newburyport, was next called upon. He said that being a new member of the Institute he came to hear, not to talk. His studies had been in other directions than science-ward. He felt the necessity of science—of a knowledge of nature to make his walks more agreeable. He had learned something, and did not believe that the study of science destroyed the poetry and charms of nature.

Vice President Goodell, Chairman of the Committee to report upon the death of Rev. Mr. Barden, presented the following resolutions:

Resolved: That in the recent death of the Rev. Stillman Barden of Rockport, the Institute deplores the loss of a sincere lover of science, and an active and zealous worker in its cause; that it is peculiarly painful to the survivinl members of the Institute to reflect that its meetings wig no longer be enlivened by his presence, nor its memberll encouraged by his ever cheerful voice and his genias manners.

Resolved: That these Resolutions be entered on the records of the Institute, and that the Secretary cause a copy thereof to be sent to the family of the deceased.

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The adoption of the resolutions was moved by Dr. Wheatland, and seconded by Rev. Willard Spaulding, of Salem, who spoke with much feeling and earnestness in eulogy of the deceased. The resolutions were unanimously adopted.

The members of the Institute having received and accepted a polite invitation from Hon. Caleb Cushing to visit his house, the meeting adjourned for that purpose, after passing votes of thanks to the City authorities for the use of the Hall, to Hon. Caleb Cushing, and to Rev. Dr. Spalding, and other citizens, for their courtesies and attentions.

Repairing to Mr. Cushing's fine residence, the company were kindly greeted by the host, who not only opened all his rooms for their inspection but also entertained them with a generous hospitality, entirely unexpected, and not often bestowed by any distinguished gentleman upon so numerous a party, principally entire strangers. The privilege of such a reception may be in some measure estimated, when it is stated that Mr. Cushing has one of the finest and most extensive private collections of rare paintings to be found in the United States. They include many celebrated works of the old Spanish masters, and other valuable specimens, not omitting some of the best of Chinese art, obtained by Mr. Cushing during his various sojourns in Mexico, and Europe, and in the Oriental World. The collection comprises more than seventy distinct pieces, of different sizes, and a variety of subjects, many of them of great historical interest and value. He also possesses some choice statuary and several fine family portraits. The examination of these splendid works of art afforded the crowning pleasure of the day.

Mr. Superintendent Prescott furnished an extra train for the return trip, and the party reached home safely, highly delighted with the closing excursion of the season.

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Additions to the Museum and Library during July, August, and September, 1865.

TO THE NATURAL HISTORY DEPARTMENT.

BY DONATION.

ALLEN, J. F. Salem. Larvæ and Imago of *Ctenucha grata* from the Grape vine.

BOARDMAN, GEO. A. Milltown, Me. Embryos of the Sheldrake, Ruffed Grouse and Loon, from Milltown. Smelts, *Osmerus sp?*, and *Crangon sp?*, from St. George River. 2 Snakes and a Mineral, from near Milltown.

BOWDOIN, DR. W. L. Salem. Head and feet of a large Turtle, *Chelydra serpentina*, from a Lake in N. H.

CARLEN, SAMUEL Salem. *Syngnathus Peckianus*, from Salem Mill Pond.

CONGDON, MISS EUNICE New Bedford, Mass. Fossil *Astrea*, Vertebra of a *Cetacean*, from York River, about 2 miles from Yorktown, Va. Specimens of Cotton plant, from Virginia. Seed Vessels of a species of *Asclepias*, from Yorktown, Va. 30 specimens, 10 species, *Fossil shells*, from the Bank of James River, Va., near Allen's Landing, about 6 miles from Yorktown.

CLOUTMAN, WM. R. Salem. Specimen of a Beetle, from Salem.

COOKE, C. Salem. Coleoptera, from Pond Lily leaves. 48 specimens, 16 species, Insects, from Reading. Parasites, from the intestines of the Golden-winged Woodpecker.

COOKE, C. and PICKMAN, H. D. Salem. Collection of Insects and Fresh water Fishes, from Rye, N. H.

COVILL, T. N. Salem. 200 specimens of *Pinnotheres ostreum* Say, Oyster Crab.

CREELMAN, MRS. B. C. North Beverly. Specimen of *Solen ensis*, from Salisbury Beach.

CROSS, HENRY J. Salem. *Ascidians*, from the North River flats.

DODGE, A. W. Hamilton. Living Specimen of *Lasiurus noveboracensis* Tomes, Red Bat, from Hamilton.

EDWARDS, CHARLES Salem. Specimen of *Strombus*, from Africa.

EMERTON, JAMES H. Salem. 256 specimens, 60 species, Insects, from North Andover. *Salamander erythronota*, from the Gloucester woods. 36 specimens, 29 species, Insects, from Georgetown.

FELT, S. Q. Salem. *Tropidonotus sauritus*, and a Mineral, from North Andover. Head of an Antelope, from Sierra Leone, W. Africa.

FOOTE, REV. HENRY W. Boston. Collection of Minerals, Shells, Corals and Seeds, from various localities.

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HEATH, N. Salem. 105 specimens Insects and Spiders, from Salem.

HINES, MRS. Salem. A Glow-worm (living specimen) *Lampyris noctiluca* (*female larva*), from Boston.

HOOPER, NATHANIEL M. Salem. Nuts, from Cayenne, S. A. Albert Coal, from Hillsboro, N. B.

JOHNSON, DANIEL H. Salem. Clam, *Mya*, with a double shell, from Ipswich.

KIMBALL, JAMES Salem. 6 specimens of "*Spanworm Moths*," from New York.

LANDER, MISS L. Salem. Large Moth, from Salem.

LARABEE, EBEN L. Salem. A. Large collection of Sponges, from under the draw of Beverly Bridge.

LOVETT, EDMONDS Beverly. Skin of a Leopard, from West Africa.

MACK, DR. WM. Salem. Specimen of *Tenia solium*.

MASON, —— Jamestown, N. Y. Silver Ore, from Colorado Territory.

MCILWRAITH, THOMAS Hamilton, C. W. Skins of *Lanius excubitoroides* and *Plectrophanes lapponicus*, from Hamilton, C. W.

NELSON, AUGUSTUS Georgetown. Clay, from Georgetown.

NELSON, HENRY A. Georgetown. Pupa, Imago and Parasite of the *Tent Caterpillar*.

NORWOOD, PROF. J. G. Columbia, Mo. A collection of 687 specimens, 298 species of Western Fossils. Identified.

OSGOOD, MRS. CHAS. Salem. Specimens of a dipterous Insect, from Salem.

PALFREY, CHAS. W. Salem. 5 Eggs of the Mocking Bird, *Mimus polyglottus*.

PICKMAN, H. D. Salem. Dragon-fly, from Salem.

PORTER, E. J. Salem. Specimen of *Epiera riparia*, from Salem.

PRESTON, JOHN Georgetown. Several Minerals, from various localities.

PUTNAM, C. A. Salem. *Dipterous larva*, from the Canal of Naumkeag Mills, Salem. Star-nosed Mole, *Condylura*, from Lawrence. 4 Trout, *Salmo fontinalis*, from the Aqueduct Fountains in South Danvers. 6 *Osmerus;* 2 *Ctenolabrus;* 2 *Morrhua* (young); *Phycis* (young); *Platessa*, from Salem Harbor.

PUTNAM, F. W. Salem. *Storeria Dekayi* and *Tropidonotus sauritus*, from North Andover. *Fundulus multifasciatus*, from Andover Pond. Gall-flies and parasites in several stages, from the Galls on the Wild Rose.

ROBINSON, ASA P. New York. Skin of *Rana Catisbiana*, from Lake Umbagog, Me.

RUSSELL, MISS M. A. Salem. Specimen of Walking stick, *Spectrum Femoratum*.

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SAUNDERS, CAPT. O. H. Salem. Lead Ore and Lime, from Island Pond, Canada.

SMITH, SAMUEL H. Salem. Specimen of *Platyphyllum concavum*, Katy-did, from Holmdil, N. J.

SPRINGFIELD CITY LIBRARY MUSEUM, by S. STEBBINS. 500 specimens Spiders, 2 specimens *Polyommatus porsena*, from Springfield.

STEBBINS, S. and BENNETT, C. W. Springfield. Specimen of Rattlesnake, *Crotalus durissus* Linn., from Mt. Tom.

STILES, FREDERIC Topsfield. White Rat from Topsfield.

STONE, ALFRED Providence, R. I. Nest and young of *Vespa maculata*. Nest and young of *Polistes sp?*, from Providence, R. I.

TELLKAMPF, DR. A. New York. *Ascidia nov. sp.*, from Huntington Bay, Long Island.

TENNEY, PROF. S. Poughkeepsie, N. Y. Copperhead Snake, from Mt. Holyoke.

TRUE, JOSEPH Salem. Stone bored by Shells, from the Grand Banks. Insects, from Salem.

UPTON, CAPT. GEORGE Salem. 2 specimens (skins) of Birds, and specimens of Polyzoa, from the Grand Banks?

WEBB, CAPT. BENJ. Salem. Specimen of *Spondylus*, from the West Indies. 2 specimens of Coral and 4 of Minerals, from various localities. Tree Toad, from China?

WHEATLAND, MISS M. G. Salem. Minerals, from the Banks of the Genessee River, Rochester, N. Y.

WILSON, CHARLES S. Salem. Specimen of the Hoary Bat, *Lasiurus cinereus* Allen, from Salem.

WILSON, MRS. THOS. Salem. Nest of the Chimney Swallow, from Salem.

WOODS, HENRI N. Rockport. *Fistularia serrata* Bloch, from Rockport Harbor.

TO THE HISTORICAL DEPARTMENT.

BY DONATION.

ABBOTT, JOHN Beverly. Leaves of the Charter Oak.

ALLANSON, LIEUT. J. S. Marblehead. 4 Confederate Buttons. 2 Confederate Torpedo caps. Several pieces of Confederate fuse. $10, and 50 cent script of Confederate States.

CARPENTER, J. S. Salem. $1, $500 and two $100 (different issues) Confederate paper currency.

CONGDON, MISS EUNICE New Bedford. 3 balls and a fragment of a shell picked up outside the Fort, soon after the Confederate troops

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evacuated Yorktown, Va. Slate and pieces of Brick from the ruins of William and Mary College, after the battle of Williamsburg, Va. A piece of the Tombstone of "Major William Gooch, dyed Oct. 29, 1650," near the spot where Cornwallis surrendered to Washington. A piece of Window glass, from the house in which Cornwallis had his Head Quarters in the Fort at Yorktown, Va. Lath, Plastering, and Moss from the roof of the "*Capitulation House*," Head Quarters of Gen. Washington, and near which Gen. Cornwallis surrendered, Oct. 19, 1784, about 1½ miles from the Fort at Yorktown, Va.

DENSLOW, W. W. New York. Revolutionary button of the 57th Regiment, British Army, found on Washington Heights.

FOOTE, CALEB Salem. $10 note Confederate currency.

FOOTE, REV. HENRY W. Boston. 13 Plaster Medallions. Seeds and leaves, from various Historical places, and other specimens.

GOLDTHWAITE, JOSEPH A. Salem. A collection of North Carolina paper currency.

GRANT, LIEUT. FRANKLIN Salem. Cutlass taken from the wreck of the Confederate Steamer Merrimac, at Newport News. Piece of one of three Muskets stacked over the magazine of Ft. Fisher at the time of the explosion.

HOTCHKISS, HENRY L. New Haven, Ct. Photographic views of Ike Marvel's House; Temple Street, New Haven; Library Building and Alumni Hall, Yale College; Hillhouse Avenue, New Haven; Prof. B. Silliman, Sen., and President Woolsey.

LONG, ISAAC M. Salem. 1628 "Patriotic Envelopes" collected during the first part of the Rebellion.

LOVETT, EDMONDS Beverly. 3 Native swords, from the West Coast of Africa.

ORDWAY, COL. ALBERT Richmond, Va. 120 specimens, different denominations and issues, Confederate paper currency.

PITMAN, AUGUSTUS P. Salem. Palmetto Flag.

ROBERTS, DAVID Salem. Confederate paper currency.

SHORT, JOSEPH Salem. Various relics from the Battle Field of Gettysburg.

TENNEY, GORHAM D. Georgetown. Indian Arrow Head, from Georgetown.

WEBB, CAPT. BENJAMIN Salem. Chinese toy.

WILLIAMS, W. A. Salem. Indian relics, consisting of a stone pot, stone chisel, stone arrowheads and a twisting-stone, also a few small bones of a skeleton, and a piece of Red Ochre, taken from an Indian grave on Salem Neck, under the embankment of Ft. Pickering.

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TO THE LIBRARY.

By Donation.

Andrews, Mrs. James H. Endicott's Memoirs of John Endicott, 1 vol., 4to, Salem, 1847.

Atwood, E. S. Atwood's Discourse on Lincoln, 8vo, pamph., Salem, 1865.

Barrande, Joachim A. Paris. (Through Smithsonian Institution.) Defense des Colonies par J. Barrande, 1 vol., 8vo, Paris, 1865.

Batchelder, Mrs. John H. The Last will and Testament of Capt. Miles Standish, Broad-sheet.

Board of Agriculture of Lower Canada. Prize List for the Exhibition at Montreal, Sept., 1865, 8vo, pamph.

Brooks, Henry M. Fidler's observations in United States and Canada, 1 vol., 12mo, New York, 1833.

Brunet, Le Abbé Ovide Quebec. Catalogue des Plantes Canadiensis by Brunet, 1st Liv. 8vo, pamph., Quebec, 1865.

Chapman, John Attwood's Discourse on Lincoln, 8vo, pamph., Salem, 1865.

Chase, Mrs. E. E. U. S. Sanitary Commission, Nos. 87 and 90. The Sanitary Reporter for May 15, 1865. The Sanitary Commission Bulletin for June 1, 1865, and No. 39. U. S. Sanitary Commission pamphlets, 5.

Chase, George C. Friend's Review, 9 Nos. Proceedings of the Alumni Association of Friends Yearly Meeting School, 1865, 8vo, pamphlet.

Chase, George H. Intellectual Symbolism, a basis for Science by Pliny E. Chase, 1 vol., 4to, Phil., 1863. Sanscrit and English Analogues by Pliny E. Chase, 1 vol., 8vo, London, 1860.

Chase, Thomas Haverford College, Penn. The Manuscripts of the Satyricon of Petronius Arbiter, Des. and col. by Chas. Beck, 1 vol., 4to, Cambridge, 1863.

Congdon, Eunice New Bedford. De Obligatione Conscientiae Praelect, Decem a Roberto Sandersono, 1 vol., 12mo, Londini, 1719.

Couper, William Quebec, C. E. Fraser's Journal relating to the Seige of Quebec in 1759, 8vo, pamph.

Curwen, George R. Church Review, vol. xv, Nos. 1, 2, 3, 4. Miscellaneous pamphlets, 16.

Denslow, W. W. New York. Plays, by Barry Cornwall, H. H. Milman, James Haynes and David P. Brown, 1 vol., 8vo.

Drowne, Charles Troy, N. Y. Annual Register of the Rennselaer Polytechnic Institute, 1865, 8vo, pamph.

Eliot, John F. Boston. Reports of Mass. Humane Society, 5.

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FABENS, JOSEPH WARREN The Uses of the Camel, a paper by J. W. Fabens, 8vo, pamphlet, New York, 1865.

GILL, THEODORE Washington. Descriptions of New Species &c., by Theo. Gill, in 17 pamphlets.

GREEN, SAMUEL A. Boston. Warder and Catlett's Account of the Battle at Young's Branch or Manassas Plain, July 21, 1861, 16mo, 1 vol., Richmond, 1862. New Testament, 1 vol., 16mo, Atlanta, Ga., 1862. 25 Pamphlets printed in Richmond relating to the Confederacy. Report of the School Committee of Boston, 1864, 1 vol., 8vo, Boston, 1865. The Boston Business Directory, 1863—4, 1 vol., 12mo. 49 Miscellaneous pamphlets.

HOLMES, JOHN C. Detroit, Mich. Michigan School Report and Laws, 1863, 1 vol., 8vo. Michigan School Report, 1864, 1 vol., 8vo. 3d An. Rep. of Michigan Board of Agriculture, 1 vol., 8vo, Lansing, 1864. Elford's Marine Telegraph, 1 vol., 8vo, Charleston, 1823. Warren's Ten thousand a year, 1 vol., 8vo, Phil., 1841. Mitchell's United States, 1 vol., 8vo, Phil., 1834.

HOTCHKISS, SUSAN V. New Haven, Conn. Ten pamphlets and College Exercises relating to Yale College.

HUGUET-LATOUR, L. A. Montreal. Journal of Education, vol. VII, Nos. 7, 8, 9, 10, 11, 12, 4to, Montreal, 1863. Journal de Institution Publique, vol. VII, Nos. 9, 10, 11, 12, 4to, Montreal, 1863.

LANDER, W. W. A collection of blanks used in the department of the Commissary of Subsistence, U. S. Army.

LANGWORTHY, ISAAC P. Philadelphia. 10 Reports of the American Sunday School Union, 8vo, pamph., Philadelphia.

LEE, JOHN C. Stewart's Geography for Beginners (Palmetto Series) 1 vol., 12mo, Richmond, 1864.

LESQUEREUX, LEO Columbus, Ohio. Botanical and Palæontological Report of the Geol. Survey of Arkansas, 8vo, pamph. Palæontological Rep. of Geol. Survey of Kentucky, 8vo, pamph. Musci Boreal-Americani, by Sullivant and Lesquereux, 8vo, pamph. Lesquereux on Coal formations of North America, 8vo, pamph. Lesquereux on Californian Mosses, 4to, pamph. 4th Report of the Geol. Survey of Kentucky, 8vo, 1 vol., Frankfort, 1861. Lesquereux on the Origin of Prairies, 8vo, pamph.

LORD, N. J. Boston Post for April, May and June, 1865.

MACK, SAMUEL E. St. Louis Mo. Edward's St. Louis Directory, 1865, 1 vol., 8vo.

MANNING, ROBERT Perry's Eulogy on Stanley, 8vo, pamph., Salem, 1865.

MEEHAN, THOMAS Philadelphia. The Gardeners' Monthly, vols. 2, 3, 4, 5, 6 and 7, 8vo, Phil., 1860, &c.

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NORWOOD, J. G. Columbia, Mo. 1st and 2d Annual Reports of Geol. Survey of Missouri, by G. C. Swallow, 1 vol., 8vo, Jefferson City, 1855. Catalogue of Univ. of Missouri for 1862, 3, 4 and 5, 8vo, pamph.

OSGOOD, GEORGE P. Autocrasy in Poland and Russia by Julian Allen, 1 vol., 12mo, New York, 1854.

OWEN, RICHARD New Harmony, Ind. Report on the Mines of New Mexico, by Owen and Cox, 8vo, pamph.

PAINE, NATHANIEL Worcester. Bullock's address at Worcester, June 1, 1865, on A. Lincoln, 8vo, pamph.

PALFRAY, CHARLES W. An. Rep. of Adj. Gen. of Missouri, 1863, 1 vol., 8vo.

PERKINS, HENRY Philadelphia. The Soldier's Guide in Philadelphia, 1865, pamph.

PHILLIPS, STEPHEN H. Sectional Maps of Farming and Wood Land for sale by Illinois Central R. Road, 8vo, pamph., Chicago, 1865. Lamark, Historie Naturelle des Animaux Sans Vertebres, vol. 1, pt. 1, and vol. 2, 8vo, Bruxelles, 1837. Walter S. Newhall, a memoir, 1 vol., 8vo, Phil., 1864. Dietrichsen and Hannay's Royal Almanack for 1861, 8vo, pamph., London, 1861. Ocean Telegraphing by S. F. Van Choate, 8vo, pamph., Cambridge, 1865.

PITMAN, AUGUSTUS P. Brevard's Digest of Pub. Statute Laws of S. Carol., vol. 2, 8vo, Charleston, 1814. Acts of Assembly of S. Carol., 1801 to 1804, 8vo, 1 vol., Charleston. Several unbound Manuscripts.

PULSIFER, DAVID Boston. The State House in Boston, Mass. by David Pulsifer, 12mo, pamph., Boston, 1865.

RANDALL, STEPHEN Providence, R. I. Aspinwall's remarks on the Narragansetts patent, 2d ed., 8vo, pamp., Providence, 1865.

ROPES, CHARLES A. Trow's New York City Directory, vol. 75, 1 vol., 8vo, New York, 1862.

SAFFORD, JOSHUA Spiritual Songs, 1 vol., 12mo, Boston, 1787.

STEARNS, GEORGE L. Boston. 26 Pamphlets.

STEVENS, MISS CAROLINE Rochester, N. Y. Rochester Directory for 1847—8, 1 vol., 12mo. Several Newspapers.

TRÜBNER & CO., London. Trübner's Amer. and Orient. Literary Record, vol. 1, Nos. 2 and 3.

WATERS, H. F. G. Regulations of Med. Dep't of Confed. States Army, 8vo, pamph., Richmond, 1861.

WATERS, J. LINTON Chicago, Ill. The Prairie Chicken, 1864, 1 vol., 4to, Tilton, 1864—5. Monthly, under the auspices of the late Mrs. Kirkland.

WEBB, BENJAMIN Howison's Dictionary of the Malay Tongue, 1 vol., 4to, London, 1801.

WHEATLAND, MARTHA G. Daily Evening Transcript, July, 1864, to July, 1865, 2 vols., folio.

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WHEATLAND, STEPHEN G. Roll of Students of Harv. Coll. in the Army and Navy during the Rebellion, 12mo, pamph., 1865. Porcellian Catalogue, 1865, 8vo, pamph.

WIGGIN, J. K. Boston. A. L. Stone's, Discourse on A. Lincoln, April 16, 1865, 8vo, pamph.

WILLIAMS, HENRY L. 12 Rail Road Reports.

BY EXCHANGE.

AMERICAN ANTIQUARIAN SOCIETY. Proceedings of Meeting April 26, 1865, 8vo, pamph.

AMERICAN GEOGRAPHICAL AND STATISTICAL SOCIETY. Proceedings, pages 117—176, 8vo, pamph, New York, 1865.

AMERICAN, PHILOSOPHICAL SOCIETY. Proceedings, No. 73, pamph., Phil., 1865.

BOSTON PUBLIC LIBRARY. A Memorial of Joshua Bates, from the city of Boston, 1 vol., 8vo, Boston, 1865.

CALIFORNIA ACADEMY OF NATURAL SCIENCES. Proceedings, vol. 3, pt. 2, 1864, San Francisco, 1864.

CANADIAN INSTITUTE. The Canadian Journal for July, 1865.

CHICAGO HISTORICAL SOCIETY. Brown's Historical Sketch of the early movements in Illinois for legalizing Slavery, 8vo, pamph., Chicago, 1865.

DARTMOUTH COLLEGE LIBRARY. Catalogus Collegii Dartmuthensis, 1864, 8vo, pamph. Catalogue of Dartmouth College for 1864—5, 8vo, pamph.

EDITORS. The Gardener's Monthly for July, Aug. and Sept., 1865.
American Journal of Science for July and Sept., 1865.
Savannah Daily Herald.
Florida Union.
Historical Magazine for July and Aug.
American Journal of Ophthalmology, vol., 2, No. 2.
The Home Evangelist.
North American Review, July, 1865.
The Essex Banner.
Haverhill Gazette.
Lawrence American.
Salem Observer.
South Danvers Wizard.
Lynn Weekly Reporter.

IOWA STATE HISTORICAL SOCIETY. The annals of Iowa for July, 1865, 8vo, pamph.

LONG ISLAND HISTORICAL SOCIETY. 2d Annual Report, 8vo, pamph., Brooklyn, 1865.

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MUSEUM OF COMPARATIVE ZOÖLOGY AT CAMBRIDGE. Illustrated Catalogue of, No. 1, 8vo, pamph., Cambridge, 1865.

NEW ENGLAND HISTORIC—GENEALOGICAL SOCIETY. N. E. Hist. Gen. Register for July, 1865. Eulogy on A. Lincoln before N. E. Hist. Gen. Soc., May 3, 1865, 8vo, pamph.

NEW YORK CHAMBER OF COMMERCE. An. Rep., 1864—5, 1 vol., 8vo, New York, 1865.

NEW YORK LYCEUM OF NATURAL HISTORY. Annals vol. VII, Nos. 1, 9, vol. VIII, Nos. 2, 3, 4 and 5.

NEW YORK MERCANTILE LIBRARY ASSOCIATION. 44th Annual Report, 8vo, pamph.

PHILADELPHIA ACADEMY OF NATURAL SCIENCES. Proceedings No. 2, for April, May and June, 1865.

QUEBEC LITERARY AND HISTORICAL SOCIETY. Transactions, Session of 1864—5, 8vo, pamph., Quebec, 1865.

REDWOOD LIBRARY AND ATHENÆUM. Report Made Sept. 28, 1864, 8vo, pamph., New York, 1864.

YALE COLLEGE LIBRARY. Catalogus Collegii Yalensis, 1865, 8vo, pamph. Obituary Record of the Graduates of Yale College, July 26, 1865, 8vo, pamph.

TUESDAY, OCTOBER 3. Adjourned Regular meeting.

Vice President ALLEN in the chair.

Samuel Q. Felt, of Salem, was elected a Resident Member.

MONDAY, OCTOBER 16. Regular meeting.

N. WESTON, JR., in the chair.

The Secretary read by title the following communication:—"*Prodrome of a Monograph of the Pinnipedes.*" By Prof. Theodore Gill, of the Smithsonian Institution.

James N. Estes, of South Danvers, was elected a Resident Member.

MONDAY, NOVEMBER 6. Regular meeting.

Dr. GEORGE B. LORING in the chair.

Letters were read from:—

T. McIlwraith, Hamilton, C. W.; M. S. Bebb, Washington, D. C.; W. H. Niles, Cambridge; W. E. Endicott, Canton; H. C. Perkins, New-

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buryport; N. S. Shaler, Cambridge; Stephen D. Poole, Lynn; Prof. A. E. Verrill, New Haven, Ct.; W. M. Hunting, Fairfield, N. Y.; L. L. Thaxter, Boston; B. P. Mann, Concord; E. E. Barden, Rockport; Prof. C. E. Hamlin, Waterville, Me.; R. E. C. Stearns, San Francisco, Cal.; Prof. J. Wyman, Cambridge; Prof. W. B. Rogers, Boston; Julius Silversmith, New York, N. Y.; A. B. Kendig, Marshalltown, Iowa; W. O. White, Keene, N. H.; W. O. Currier, Providence, R. I.; E. W. Hervey, New Bedford; W. W. Denslow, New York, N. Y.; John Bolton, Portsmouth, Ohio; American Philosophical Society; Joseph Blake, Gilmantown, N. H., relating to the publications: E. Suffert, Matanzas, Cuba; Dr. J. C. Puls, Ghant, Belgium; Prof. R. Owen, Bloomington, Ind.; James Lewis, Mohawk, N. Y.; Smithsonian Institution; G. L. Stearns, Boston; W. Wallis, Salem; Dr. S. A. Green, Boston; A. W. May, Boston; Mrs. E. E. Chase, Salem; J. Linton Waters, Chicago, Ill.; Rev. C. F. Barnard, Boston, relating to the transmission of specimens and books: B. O. Peirce, Beverly; Prof. James Hubbert, Richmond, C. E.; Prof. A. E. Verrill, New Haven, Ct.; Geo. C. Huntington, Kelley's Island, Ohio; E. T. Cresson, Philadelphia, Pa.; Horace Mann, Concord; A. E. Kursheedt, Cincinnati, Ohio; Mrs. P. A. Hanaford, Reading; J. F. Allen, Salem; W. B. Trask, Boston; John Krider, Philadelphia, Pa.; Dr. Wm. Stimpson, Chicago, Ill.; W. J. Howard, New York, N. Y.; Henri N. Woods, Rockport; Chas. A. Emery, Springfield; G. A. Boardman, Milltown, Me.; Hon. C. Cushing, Newburyport; I. L. Gosling, New York, N. Y.; H. A. Bellows, Concord, N. H.; James W. Perkins, Salem; J. C. Holmes, Detroit, Mich.; Prof. J. G. Norwood, Columbia, Mo.; Wm. Merritt, Salem; Capt. D. H. Johnson, Jr., Salem; Dr. H. C. Perkins, Newburyport; Prof. S. Tenney, Poughkeepsie, N. Y.; T. A. Cheney, Havana, N. Y.; E. E. Barden, Rockport; Hon. O. P. Lord, Salem; F. W. Putnam, Salem; Hon. A. Huntington, Salem, on general business: New York Lyceum of Natural History; Buffalo Society of Natural Sciences; New York Historical Society; Trustees of Dartmouth College; New England Historic-Genealogical Society; Museum Comp. Zoölogy; Albany Institute; Maine Historical Society, acknowledging the receipt of publications: Prof. J. G. Norwood, Columbia, Mo.; Josiah Stickney, Boston; A. T. Mosman, Beverly, accepting membership.

Donations to the Library and Museum were announced.

Adjourned to Tuesday evening, Nov. 14.

WEDNESDAY, NOVEMBER 8. Stated meeting.

N. WESTON, JR., in the chair.

Adjourned to Tuesday evening, Nov. 14.

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TUESDAY, NOVEMBER 14. Adjourned Regular and Stated meetings.

Vice President GOODELL in the chair.

Donations to the Museum and Library were announced.

Mr. W. P. Upham read two letters; one, written by Col. Azor Orne, of Marblehead, to Governor Adams, dated May 20, 1796, in which Col. Orne says his advanced age and infirm health forbid his attention to public business, and therefore he resigns the office of Senator for the County of Essex to which he had been chosen. The other letter was written by Samuel Sewall, afterwards Chief Justice of the Supreme Court, and is dated Jan. 27th, 1780, at Marblehead, where he was then commencing the practise of law. The letter gives a graphic account of the sufferings of the people of Marblehead from the scarcity of wood occasioned by the great snowstorm of that winter.

Mr. Upham gave a brief sketch of the character of Col. Orne, and an account of the family of Judge Sewall.

The Communication of Mr. Upham was referred to the Publication Committee for publication in the Historical Collections.

Dr. Loring made some remarks in connection with the subjects of Mr. Upham's communication, and narrated several incidents of the poverty of the people from 1765 to 1800.

Mr. Caleb Cooke read a portion of his notes on Zanzibar, Africa, made during a residence of four years on the Island, in which he gives an account of the Island and the customs of the inhabitants, with remarks upon the Natural History of the place.

Mr. Cooke's notes were requested for publication.

Benjamin Pickman, M. D., of Salem, was elected a Resident Member.

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Monday, December 4. Regular meeting.

Rev. George D. Wildes in the chair.

Letters were announced from the following:—

Prof. S. F. Baird, Smithsonian Institution; Prof. A. Guyot, Princeton, N. J.; Capt. Alpheus Hyatt, Baltimore, Md.; E. S. Morse, Portland, Me.; Prof. A. E. Verrill, Yale College; H. M. Raynor, New York; Thomas Bland, New York; Prof. Theo. Gill, Smithsonian Institution; Prof. Wm. P. Blake, San Francisco, Cal.; Joseph E. Chase, Holyoke, Mass.; Wm. Couper, Quebec, Canada; Prof. J. G. Norwood, Columbia, Mo.; Dr. J. C. Puls, Ghent, Belgium; A. M. Edwards, New York; C. S. Fellows, Boston; Henry B. Dawson, Morrisania, N. Y., relating to the publications: Prof. E. D. Cope, Haverford College, requesting the loan of specimens: Prof. S. F. Baird, Smithsonian Institution; Prof. A. E. Verrill, Yale College; S. Stebbins, Springfield; Hon. H. A. Bellows, Concord, N. H.; Robert E. C. Stearns, San Francisco, Cal.; Geo. A Boardman, Milltown, Me.; Dr. Theo. A. Tellkampf, New York; Frank Stratton, Natick, Mass.; Wm. Couper, Quebec, Canada; John S. Stevens, London, Eng.; Prof. Leo Lesquereux, Columbus, Ohio; Dr. Daniel Clark, Flint, Mich.; Prof. J. G. Norwood, Columbia, Mo.; Thomas Barlow, Canastota, N. Y. Dr. J. C. Puls, Ghent, Belgium; Prof. Richard Owen, Bloomington, Ind.; M. G. Farmer, Salem; Francis C. Webster, Salem; Justin Hinds, Salem; Richard Eddy, Libr., Pennsylvania Historical Society; N. E. Atwood, Provincetown; Fitch Poole, South Danvers; C. P. Preston, Sect. Essex Agricultural Society; Desmond Fitzgerald, Providence, R. I.; John R. Bartlett, Providence, R. I.; Geo. Brinley, Hartford, Ct., on various business matters and the transmission of specimens and books: Baron R. Osten-Sacken, Russian Consul at New York, accepting membership: New Haven Colony Historical Society, acknowledging the receipt of Publications.

Donations were announced to the Library and Museum.

Capt. N. E. Atwood, of Provincetown, made a verbal communication on the Lobster.

The Lobster is found in great abundance on our coast from the southern point of Cape Cod northward, being plentiful in the Gulf of St. Lawrence. They are caught in the vicinity of the Islands of Boston harbor and along the "North shore" during the whole year. In winter they are caught in deep water. As the spring advances, they come near the shore and are taken in vast quantities.

In March, April, May, and June, large numbers are taken and sent to Boston, New York and other markets,

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where they are sold to wholesale dealers; and there are also several establishments on the coast of Maine where they are put up in cans, which are hermitically sealed, for transportation to foreign markets; the fishery thus gives employment to a great number of persons.

On the North Shore, including the coast of Maine, during July, and until the next spring, the Lobsters are less plentiful, and a large portion of them are "soft shelled" and in poor condition for an article of food.

Of the Lobsters taken on the North Shore, at all seasons, more than three quarters are males, while those in the vicinity of Cape Cod are nearly all females, at all times when they are found in that region, such is the disproportion of the sexes in different localities.

In Boston the male Lobster is prefered, consequently Lobsters from Cape Cod will not sell there until they begin to catch less on the North Shore. In New York, on the contrary, they prefer the female Lobsters and the supply for that city comes from Cape Cod, when the Lobsters can be caught there.

The female Lobster is considered the best at Cape Cod, and usually they are in the best condition. Most of the males are coarse and poor, and are nearly all thrown away when they are caught.

At Provincetown, Cape Cod, the Lobsters do not come in to the shore until late in May or early in June, they are then abundant until the last of September and are in excellent condition, and are so plenty at times that one man will catch from three to four hundred in a single day. This is the time when they produce their young. They do not deposit their eggs in a particular locality, like fishes, where they will be exposed and liable to be destroyed before the young are hatched. When the Lobster lays her eggs they adhere to the under part of the tail by a glutinous substance, and remain there in safety during the term of incubation, consequently countless millions are hatched every season.

Before the Bluefish came north of Cape Cod (1847), Lobsters were very scarce in the waters about the Cape. The reason of this was owing to the large number of small fishes which remained along the coast during the summer

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and fed upon the young Lobsters, since the appearance of the Bluefish and the consequent disappearance of the smaller fishes, the Lobsters have increased tenfold, so that the supply is now equal to the demand. The Lobsters leave the shores of Cape Cod in October, and, going to parts unknown, do not return until the next May or June.

On Mr. Putnam's asking Capt. Atwood several questions relating to his late examiniation of the fisheries of the Merrimack and Connecticut rivers, considerable discussion ensued regarding the practicability of restocking those rivers with Salmon and Shad, and the protection of the fish; in which Messrs. Atwood, Putnam and others participated, and Mr. Putnam explained how, in his estimation, the rivers could easily be restocked, and the fish protected by the construction of proper "fish ways" over the dams, and the enforcement of laws drawn up with reference to the habits of the fishes in question.

MONDAY, DECEMBER 18. Regular meeting.

Vice President GOODELL in the chair.

Letters were read from :—

Prof. Theo. Gill, Smithsonian Institution; Prof. A. E. Verrill, Yale College; Prof. J. Wyman, Harvard College; Samuel R. Carter, Paris Hill, Me.; H. A. Smith, Cleveland, Ohio; Mrs. P. A. Hanaford, Reading; John R. Bartlett, Providence, R. I., on business matters: Edw. L. Graef, Brooklyn, N. Y.; Andrew Garrett, Tahiti, South Seas; Prof. James Hall, Albany, N. Y.; H. M. Raynor, New York, N. Y.; Prof. S. F. Baird, Smithsonian Institution; Joseph E. Chase, Holyoke, relating to the publications: Natural History Society of New Brunswick, acknowledging the receipt of publications.

The Secretary read a Biographical Notice of the late Rev. Stillman Barden, prepared by Mrs. P. A. Hanaford, which was referred to the Publication Committee, and a vote of thanks was passed to Mrs. Hanaford, for the interesting memoir of our late associate.

Mr. James H. Emerton exhibited a large and handsome living specimen of *Actinia marginata*, taken under Beverly

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Bridge, and gave an account of its habits while in confinement. He was followed by Mr. Putnam, who explained the anatomical structure and mode of development of the Actinia and its relation to the Coral producing Polyps.

The Superintendent exhibited a number of Indian relics taken from a grave on Winter Island, Salem, near the embankment of Ft. Pickering, just west of the fosse. The grave was about four feet long, two wide, and two deep, and was made by placing a few stones about two feet from an abrupt ridge on a ledge and resting other stones from these to the ledge.

The following relics were found:—Six partially finished Arrow heads of stone. Four completely made Stone Arrow heads. One Stone Chisel or Gouge. One "Twisting Stone." (A thin oval stone with two holes in it, supposed to have been used in twisting when making a kind of twine). One "Polishing Stone." (An oval stone fitted to the hand, and probably used in rubbing skins of animals used for clothing). A number of fragments of a Pot made of soapstone and of an oval shape; estimated from the fragments to have been about fourteen inches long, ten wide, and four deep. A portion of one end of the pot has a knob or handle. The pot is smoothly finished on the inside, rougher on the outside, and formed in a regular manner, with slightly ornamented or serrated edges. The bottom of the pot showed signs of its having been used over a fire.

With the above mentioned implements were found a portion of a scapular and two bones of the foot of a Cow; a premolar tooth of a Hog; a small fragment of bone which could not be determined; considerable bone dust; and as much as a shovel full of a red substance mixed with earth and bone dust, and quite a large piece of pure red-ochre.

For these relics the Institute is indebted to the thoughtfulness of W. A. Williams, Esq., the Engineer at the Fort, who, as soon as the grave was discovered, reported it to the Institute for examination.

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The thanks of the Institute were voted to Mr. Williams for his valuable donation of Indian Relics.

Donations to the Museum and Library were announced.

Joseph Peabody, Hannah M. Lord and Joseph Chandler, of Salem, were elected Resident Members. John R. Bartlett, and R't Rev. Thomas M. Clark, of Providence, R. I., and Prof. Theodore Gill, of the Smithsonian Institution, were elected Corresponding Members.

Additions to the Museum and Library during October, November and December, 1865.

TO THE NATURAL HISTORY DEPARTMENT.

BY DONATION.

ASHBY, MISS ELIZA ANN Salem. Canary 16 years old.

BOSSON, A. S. Salem. Skull of Fox-hound and Fox. Italian Queen Bee.

BROOKS, H. M. Salem. Plumbago, from shores of Lake Huron, Canada.

BROWNE, A. G. Salem. Pomegranate, from Florida.

BROWNE, BENJ. JR. Salem. Red Bat, *Lasiurus noveboracensis* Tomes, from Salem.

CARPENTER, MR. Kelley's Island, Ohio. Fossils, from the sandstone quarry at Kelley's Island, Ohio. Beetles injurious to the Grape vine.

CARTER, FRANCIS Georgetown. Specimenj of Lime deposited in the Boiler of a U. S. War Steamer.

CLARK, DR. DANIEL Flint, Mich. A collection of Fishes, Insects, and Reptiles, from Flint, Michigan. 2 young Trout, from Lake Superior. Land and Fresh Water Shells, from Flint, Michigan.

COOKE, C. Salem. 20 specimens, 3 species, Medusa; 3 specimens, 3 species, Mollusks; 1 specimen Fish, from Lagulhas Banks, E. Coast Africa. 20 specimens, 2 species, of Mollusks, from Champany Island, Zanzibar Harbor. 1 Mollusk and collection of Ants, from Zanzibar, E. Coast Africa. Seed vessel, from Pangani River, E. Coast Africa.

DALL, W. H. Chicago, Ill. 1 Bat, 2 Salamanders, 3 Frogs, 1 Toad, 3 *Boleosoma*, from Lake Goodwin, Marquette Co., Mich.

EMERTON, J. H. Salem. 51 bottles of Insects, in alcohol, from Essex County.

EMERTON, J. H. and COOKE, C. Salem. Collection of Fishes, Crustacea and Radiates, from under Beverly Bridge.

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FARMER, JAMES Salem. An Eel of a bright yellow color on the back, sides and fins, and a light yellow color below, from Salem Mill Pond.

GARDNER, WILLIAM Salem. 27 specimens of *Helix cellaria*, from the Greenhouse of F. Putnam.

HASKELL, J. P. Marblehead. Eel, from a deep well in Marblehead. The specimen is a singular mal-formation; short head, large eyes and large pectoral fins.

HATCH, CHAS. Salem. Mantis, from Senegal River, W. C. of Africa.

HUNTINGTON, GEO. C. Kelley's Island, Ohio. Fossils, from the sandstone quarry at Kelley's Island, Ohio. (Lake Erie). 3 species of Beetles injurious to the grape vine and to wine barrels, Kelley's Island.

KING, MISS H. Salem. Rose Quartz, from White Mountains, N. H. Jasper, from Berlin Falls, N. H.

LEFAVOR, WM. CAPT. Salem. Specimens of wood, from 400 miles up the Uruguay River.

LEWIS, JAMES Mohawk, N. Y. *Helix*, 7 species, 685 specimens; *Planorbis*, 1 species, 58 specimens; *Cyclas*, 48 specimens; *Succinea*, 2 species, 79 specimens; *Pycidium virginicum*, 29 specimens; *Physa*, 1 species, 389 specimens; *Melania*, 2 species, 777 specimens; *Paludina*, 4 species, 1704 specimens; *Lymnea*, 1 species, 23 specimens. Also a lot of mixed Fresh-water and land shells, from various localities near Mohawk, N. Y.

LOMBARD, MISS M. E. Boston. Specimen of Humming Bird, *Trochilus colubris*, from Boston.

MARCY, PLIMPTON. Plumbago, from Starbridge Lead Mines.

NICHOLS, C. F. Salem. *Scopelus Humboldti*, from the Mediterranean. 4 species, 10 specimens, Land Shells, from Hesse Darmstadt, Germany. Coral, from the Blue Grotto at Capri, Mediterranean. Minerals, from Hesse Darmstadt, Germany. Limestone, from the Falls of Terni, Italy. 2 Minerals from Vesuvius. Lizard and Insects, from Malta.

NORRIS, C. H. Salem. Egg of African Ostrich.

OWEN, PROF. RICHARD New Harmony, Ind. A collection containing 55 species of Land and Fresh Water Shells, from the West. Also Reptiles, Fishes, Insects and Shells in Alcohol, from New Harmony, Ind.

PACKARD, DR. A. S. JR. Boston. 4 Salamanders, 2 species; 9 Lizards, 4 species; 1 Snake, from Bailey Cross Roads, near Washington, Va.

PERKINS, T. LYMAN Salem. Collection of Shells, from East Indies. Galena, Quartz and Garnets.

PICKMAN, H. D. and COOKE, C. Salem. Gold Fish, *Cyprinus auratus* and *Leuciscus americanus*, from Salem.

PUTNAM, F. W. Salem. Skulls of Deer, Lynx, Hedge-Hog, Mink, Marten (male and female) and Domestic Sheep, from Oxford Co., Me.

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Collection of Insects, Shells and Infusorial Earth, from Ipswich, Mass. Collection of Fishes, Insects, Mollusks &c., from Lake Erie and Kelley's Island, Ohio. Fossils, from Kelley's Island, Ohio.

SANBORN, F. G. Boston. 210 specimens, *Diptera*, 100 specimens, Hymenoptera, collected in Mass.

SMITHSONIAN INSTITUTION, Washington, D. C. Collection of Fishes, from various N. American localities.

TAYLOR, C. H. Lynn. Red Clay, from Maryland.

TELLKAMPF, DR. THEO. A. New York. 10 specimens *Ascidia manhattensis* Dekay. 6 specimens *Phallusia fluitans* Tellkampf (nov. sp.), from Huntington Bay, Long Island.

UNKNOWN, Danvers. Eggs of the Walking Stick, *Spectrum femoratum*.

WALKER, MILLEDGE Ossekeag, N. B. 1 Bat, 1 Green Snake, 1 Salamander, from Ossekeag, N. B.

WATERS, E. S. Salem. Mineral, from Natick, Mass.

WHEATLAND, GEORGE JR. Salem. A collection of 106 species, 208 specimens, of Shells, from various localities.

WHEATLAND, DR. H. Salem. Shells and Crustaceans, from Nahant Beach.

WHITE, G. W. Salem. 4 specimens of *Atherina notata*, from upper part of Salem Mill Pond.

TO THE HISTORICAL DEPARTMENT.

BY DONATION.

BROWNE, ALBERT G. Salem. Unsigned bills of the Bank of Commerce, Savannah, Ga.

CALLER, JAMES M. Salem. Specimens of Confederate Money.

CHAMBERLAIN, JAMES A. Salem. Coins.

CURWEN, S. R. Salem. Arabian Sandals.

DEBAKER, CAPT. V. F. Salem. A pair of Shoes, such as are worn by the Chiefs on the West Coast of Africa.

HOBBS, GEORGE J. 13 Stone Arrow heads, found at Sturbridge, Mass.

KIMBALL, JAMES Salem. Padlock, from Stone Jail in Ipswich, erected in 1800. This lock was used in the old Jail also.

LEGRAND, CHARLES Salem. Ancient Pitcher, 2 Ancient Tea Pots.

NICHOLS, C. F. Salem. Various Historical relics, from Rome and vicinity.

NORRIS, JOHN Salem. A picture of the Ship Mount Vernon of Salem, commanded by Capt. S. Elias Derby, 1789. Painted by M. C. P.

OSBORNE, STEPHEN Salem. 2 Bonnets and 4 Hats, style of 1835.

PERKINS, T. LYMAN Salem. 12 Chinese coins.

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PULSIFER, DAVID Salem. Indian Mortar and Pestle, made of stone, from California.

PUTNAM, MRS. EBEN Salem. Ancient Pitcher.

SAVORY, BENJAMIN Salem. Pair of Snow Shoes, over 90 years old.

TAYLOR, O. H. Lynn. Piece of marble, from Gov. Bradford's house, destroyed by the Confederates, 1864.

WARD, CHARLES A. Salem. Piece of "Treenail" of the old ship "Sparrow Hawk," wrecked at Cape Cod, in 1626.

WHEATLAND, GEORGE, JR., Salem. Old Shoe and Clog.

TO THE LIBRARY.

BY DONATION.

AGASSIZ, A. E. R. Cambridge. Sea-Side Studies in Natural History, by Elizabeth C. and Alex. Agassiz, 1 vol., 8vo, Boston, 1865.

BARTLETT, JOHN R. Providence, R. I. Bibliography of Rhode Island, by John R. Bartlett, 1 vol., 8vo, Providence, 1864. Records of the colony of Rhode Island, vols. 1, 2, 3, 5, 6, 7, 8, 9, 8 vols., 8vo, Providence, 1856. Index to Acts and Resolves of R. I., from 1758 to 1850, by J. R. B., 1 vol., 8vo, Providence, 1856. Registration Reports of Rhode Island, 2, 3, 5, 6, 7, 8, 10, 11, 8 vols., 8vo, Providence, 1856, &c. History of the Criminal Law, of R. I., 8vo, pamph. Journal of Constitutional convention at Newport, 1862, 8vo, pamph. Census of R. I., 1774, 1 vol., 8vo, Providence, 1858.

BROWNE, ALBERT G. Elliott's Fast Sermon, at Savannah, Feb. 28, 1862, and Sept. 15, 1864, 8vo, pamph. Elliott's Address before the Societies of S. C. Coll., Dec. 4, 1859, 8vo, pamph. Legare's oration at Columbia, S. C., Dec. 6, 1859, pamph. 7 Miscellaneous pamphlets.

BROWNE, J. VINCENT French Universal Exposition, for 1867, official Correspondence, pub. by Dep. of State, pamph., Washington, 1865.

BUNKER HILL MONUMENT ASSOCIATION. Proceedings at Annual Meeting, June 17, 1865, 1 vol., 8vo, Boston, 1865. Inauguration of the Statue of Gen. Warren, June 17, 1858, 1 vol., 8vo, Boston, 1858.

CHAPPLE, WILLIAM F. Salem Gazette for 1790, 1 vol., fol. Columbian Centinel, for 1793, 1 vol., fol.

CHASE, ELIZA E. Hospital Transports, 1 vol., 16mo, Boston, 1863. Sanitary Commission Bulletin, Nos. 33, 34 and 40. The Sanitary Reporter, vol. 2d, Nos. 19, 22. Final Report of Supply Dep't of N. E. Women's Aux. Association of Sanitary Commission, 8vo, pamph. 25 papers relating to Sanitary Commission.

CHASE, GEORGE C. Friend's Review, 10 Nos.

CHASE, GEORGE H. The U. S. Sanitary Commission, a sketch of its purposes and its work, 1 vol., 12mo, Boston, 1863.

Digitized by Google

CHASE, THOMAS Haverford College, Penn. Catalogue of Haverford College, 1865—6, pamph.

COBURN F. S. of Boston. Ames's Oration on Washington, Feb. 8, 1800, 8vo, pamph. Massachusetts Resolves for 1797, pamph., folio.

COLE, NANCY D. Silliman's Journal of Science, vols. 28 to 50, 1st series, vols. 1 to 14 of 2d series, inclusive, 37 vols.

COOKE, CALEB The Bombay Almanac, for 1858—60, 2 vols., 8vo, Bombay. Bombay Civil List, 1859, 8vo, pamph. Four pamphlets.

CROSBY, ALPHEUS Regulations for the Army of the U. S., 1861, 1 vol., 12mo. The Sisters of Solense, by C. W. S., 1 vol., 16mo, Phil., 1857. Curtis' Inventor's Manual, 1 vol. 12mo, Boston, 1861. Fibrilla, 1 vol., 12mo, Boston, 1861. Kitto's Court of Persia, 1 vol., 8vo. Dumas and Boussingault, The Chemical and Physiological Balance of Organic Nature, 1 vol., 16mo, N. Y., 1864. Davis, The Measure of the Circle perfected, 1 vol., 8vo, Providence, 1854. Bartlett, The Frontier Missionary, 1 vol., 8vo, Boston, 1853. Old South Chapel Prayer Meeting, 1 vol., 16mo, Boston, 1859. Calvert's Scenes and Thoughts in Europe, 12mo, N. Y., 1852. Challen's Igdrasil or the Tree of Existence, 12mo, Phil., 1859. Willard's Memoirs of Youth and Manhood, 2 vols., 12mo, Cambridge, 1855. Caswall, The Martyr of Pongas, 12mo, N. Y., 1857. McClintock's Narrative of the Fate of Sir John Franklin, 12mo, Boston, 1860. Coming's Physiology, 12mo, N. Y., 1854. Boutwell's Thoughts on Educational Topics and Institutions, 12mo, Boston, 1859. The U. S. Custom's Guide. 12mo, Boston, 1859. Huntington, Home and College, 12mo, Boston, 1860. Filborn's German Instructor, 12mo, Philadelphia, 1852. Dalrymple's Memoir of Great Britain and Ireland, 2 vols., 4to, Boston, 1771. Tables for correcting the apparent distance of the Moon and a Star, 4to, Cambridge, 1772. 350 Serials. 500 Miscellaneous pamphlets.

DAWSON, HENRY B. Morrisania, N. Y. The Gazette (Yonkers), from May 6 to Nov. 11, 1865.

DEAN, JOHN WARD Boston. Memoir of Rev. Giles Firmin, 8vo, pamph., Boston, 1865.

GREEN, SAMUEL A. Boston. 40 Various Pamphlets.

GRINDEL, STOVER One bound volume of Miscellaneous Newspapers, 1804, 1805, 1806.

HOTCHKISS, HENRY New Haven. Several Handbills &c.

KIMBALL, JAMES Pamphlets, 12.

LANDER, W. W. A Digest of the Military and Naval Laws of the Confederate States, 1 vol., 8vo, Columbia, 1864.

LINCOLN, SOLOMON Hingham. Notes on the Lincoln Families of Massachusetts, by S. Lincoln, 8vo, pamph, Boston, 1865.

LORD, N. J. Boston Post, for July, Aug. and Sept., 1865.

Digitized by Google

LORING, GEORGE B. Boston Daily Post, for July, Aug. and Sept., 1865.

LOVETT, JOHN W. Beverly. Eliot's Sermon at Ordin. of Rev. J. Willard, 8vo, pamph. Prince's Fast Sermon, May 9, 1798, 8vo, pamph.

MASSACHUSETTS SECRETARY OF STATE. Acts and Resolves 1864, 4 vols., 8vo, Boston, 1865. Public Documents, 1865, 1 vol., 8vo, Boston, 1865. Supplement to Ichnology of Mass., by E. Hitchcock, 1 vol., 8vo, Boston, 1865.

MILES, M. Lansing, Mich. Catalogue of State Agric. Coll., of Michigan, 1865, 8vo, pamph.

MUDGE, BENJAMIN F. Quindaro, Kansas. Fourth volume of Pub. Doc. of Kansas, Dec. 31, 1864, 8vo. Instructions, 1st Census of Kansas, 1865, 8vo, pamph.

NICHOLS, MARY H. A collection of Account Books kept by the late Dr. E. A. Holyoke. Account Books of the late B. Herbert Hathorne.

PICKMAN, BENJAMIN The Nation, vol. 1, Nos. 1 to 19, 4to, New York, 1865.

RUST, LYDIA London Magazine, for 1796, 1 vol., 8vo. 8 Miscellaneous pamphlets.

SHEPPARD, JOHN H. Boston. Reminiscences of the Vaughn Family, 8vo, pamph., Boston, 1865.

SIBLEY, JOHN L. Cambridge. Sibley's Notices of Trien. and Annual Catalogues of Harvard University, 8vo, pamph., Boston, 1865.

STEARNS, GEORGE L. Six pamphlets on various subjects.

STORY, NORMAN Essex. Crowell's address at the consecration of Spring St. Cemetery, Essex, Oct 27, 1852, 8vo, pamph.

SWASEY, MRS. JOHN Cincinnati, Ohio. Mitchill's Tennessee State Gazetteer, for 1860, 1 vol., 8vo, Nashville, 1860. Smith and Damoulin's Illinois State Business Directory, for 1860, 1 vol., 8vo, Chicago. Hawes & Co. Indiana State Gazetteer, for 1862—63, 1 vol., 8vo. Missouri State Gazetteer and Business Directory, 1 vol., 8vo, Saint Louis, 1860. Williams Cincinnati Directory, for 1849—50, 1850—51, 1851—52, 1852—53, 1855, 1856, 6 vols., 8vo, Cincinnati. Cist's Cincinnati in 1851, 1 vol., 12mo. Cist's Cincinnati in 1859, 1 vol., 12mo. Disturnell's New York State Register, for 1858, 1 vol., 12mo. Hall's Western Land Owner's Manual, 1 vol., 12mo, Auburn, 1847. Butler's History of Kentucky, 2d ed., 1 vol., 8vo, Cincinnati, 1836. Lapham's Wisconsin, 2d ed., 1 vol., 12mo, Milwaukee, 1846. Ohio Railroad Guide, illustrated, 1 vol., 12mo, Columbus, 1854. Scott's Messiahship, 1 vol., 12mo, Cincinnati, 1859. Swallow's, 1st and 2d An. Reports on the Geology of Missouri, 1 vol., 8vo, Jefferson city, 1855. William's Cincinnati Guide, for 1852, 1 vol., 16mo. Mendenhall's Map of Cincinnati, 1865.

TELLKAMPF, THEODORE A. New York. Vierzehnter Jahresbericht

Digitized by Google

der Naturhistorischen Gesellschaft zu Hannover, 1863—4, 4to, pamph., Hannover, 1865.

TRASK, ISRAEL H. Wenham. Reports of the Town of Wenham, for several years, 10 pamphlets.

TRÜBNER & Co., London. Trübner's Amer. and Orient. Literary Record, Nos. 6, 7, 8, 1865.

WALLIS, WILLIAM Christian Watchman and Reflector, from Jan. 1853 to Dec. 1865 inclusive, 12 vols., folio, Boston.

WEBB, JOSEPH H. Record books of Salem Union League, 4to, Mass.

WEBB, WILLIAM G. The Daily Citizen, for July, 2d and 4th, 1863, printed at Vicksburg on house paper.

WHEATLAND, HENRY New Hampshire Register, for 1857, 1859, 1860, 1861, 1862, 5 vols., 16mo, Concord, N. Y. Pigot & Co. Metropolitan Directory, for 1828 and 1834, 2 vols., 8vo, London.

WILDES, GEORGE D. Binney's Oration on Lincoln, at Providence, June 1, 1865, 8vo, pamph. Catalogue of Brown University, 1865—66, 8vo, pamph.

BY EXCHANGE.

BOSTON SOCIETY OF NATURAL HISTORY. Condition and Doings at Annual Meeting, May 1865, 8vo, pamph. Proceedings, vol. 10, sig. 1.

BOWDOIN COLLEGE LIBRARY. Bowdoin Ivy-day, Class of 1866, pamph. The Bugle, Bowdoin College, No. 14.

CANADIAN INSTITUTE. The Canadian Journal, Sept. 1865.

CHICAGO HISTORICAL SOCIETY. 7th An. Statement of the Trade and Commerce of Chicago, 8vo, pamph. 4th An. Rep. of Record of Public works of Chicago, 8vo, pamph.

DARTMOUTH COLLEGE. Catalogue of Dartmouth College, for 1865, 1866, 8vo, pamph.

EDITORS. Gardner's Monthly, for Oct. Nov. and Dec., 1865.
North American Review, Oct., 1865.
Florida Union.
Savannah Daily Herald.
Historical Magazine, Oct. and Nov.
The Gazette (Yonkers, N. Y).
American Journal of Science, Nov., 1865.
The Essex Banner.
Haverhill Gazette.
Lawrence American.
Lynn Weekly Reporter.
Salem Observer.
South Danvers Wizzard.
American Miner's Index.

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IOWA STATE HISTORICAL SOCIETY. The Annals of Iowa, for October,

MASSACHUSETTS INSTITUTE OF TECHNOLOGY. First Annual Catalogue, 1865—66, 8vo, pamph.

MONTREAL SOCIETY OF NATURAL HISTORY. The Canadian Naturalist and Geologist, for Aug. and Oct. 1865.

NEW BRUNSWICK NATURAL HISTORY SOCIETY. Gold Mines and Gold Mining in Nova Scotia, by H. F. Perley, 8vo, pamph., Montreal, 1865.

NEW ENGLAND HISTORIC—GENEALOGICAL SOCIETY. N. E. Hist. Gen. Reg., Oct., 1865.

NEW HAMPSHIRE HISTORICAL SOCIETY. Adj. General's Report of New Hampshire, 1865, 2 vols., 8vo, Concord, 1865. Municipal Register, of Concord, 1864, 8vo, pamph.

NEW HAVEN HISTORICAL SOCIETY. Papers of N. H. Hist. Society, vol. 1, 8vo, New Haven, 1865.

NOVA SCOTIA INSTITUTE OF NATURAL SCIENCE. Proceedings and Transactions, vol. 2, pt. 3, 8vo, pamph., Halifax, 1864—65.

PHILADELPHIA ACADEMY OF NATURAL SCIENCES. Proceedings for July and Aug., Sept. and Oct., 1865.

PHILADELPHIA ENTOMOLOGICAL SOCIETY. A Memoir of Thomas B. Wilson, by a Committee of the Society, 8vo, pamph., Philadelphia, 1865.

YALE COLLEGE LIBRARY. Catalogue of Officers and Students in Yale College, 1865—66, 8vo, pamph.

ZOÖLOGISCHE GESELLSCHAFT, FRANKFURT a. M. Der Zoölogische Garten, vol. 6, Nos. 1 to 6.

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ERRATA TO THE PROCEEDINGS.

Page V, line 12, for Camby, *read* Canby.
" VII, " 21, " John H. Bettis, *read* John B. Bettis.
" X, " 13, " conventical, *read* conventual.
" XIX, " 13, " 1623, *read* 1627.
" XXXVI, " 16, " *Phaleris microcerus*, read *Mergulus alle*.
" LXXI, " 38, " *P. hyalina*, read *P. vitrea*, and for *P. pennisewassecensis*, read *P. Arethusa*.
" CXXXIII, " 19, after the word "yards," *insert* higher.
" CXXXVI, " 25, for Thomas Maxwell, *read* Thompson Maxwell.
" CLVIII, " 12, " Henry P. Hendrick, *read* Henry P. Herrick.

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Creesey, Charles . . IV
Cross, J. S. . . XLVII
Daland, John . . CIV
Daniels, George P. . . XLIII
Davis, Abner H. . . CXXIX
Davis, S. W. . . XXXV
Dean, Edward . . CXVI
Dixey, John . . CIII
Doggett, William E. . . CXLIX
Downing, John H. . . XLIII
Doyle, Mary . . XLVII
Drowne, Thomas R. . . XCVIII
Emmerton, William H. . . LXIV
Endicott, Robert R. . . CXLVI
Endicott, Sarah B. . . CXLIX
Estes, James N. . . CLXXV
Farrington, George P. . . XXXV
Felt, John . . XLIII
Felt, Samuel Q. . . CLXXV
Fenollosa, Manuel . . XLIII
Flint, Harrison O. . . XLIII
Fogg, Julian A. . . XLVII
Foster, Joseph C. . . CXLVI
Fowler, Charles B. . . XCIV
Fowler, George . . CXXV
Fuller, George A. . . XLIII
Gardner, Henry R. . . CXXVI
Glazier, Charles H. . . XLIII
Goldthwaite, Willard . . XLIII
Hagar, D. B. . . CLVI
Hale, Henry . . XLIII
Hale, James F. . . XXXV
Hale, M. H. . . XLIII
Hall, Harmon . . XLVII
Hammond, J. Leonard . . CLVI
Hanson, Joseph H. . . XLIII
Haskell, Daniel C. . . XLIII
Haskell, William . . CLVIII
Hawkes, C. M. . . XLVII
Herrick, Henry P. . . CLVIII
Hill, James . . CLVIII
Hodges, Samuel R. . . XLIII
Hoffman, Mrs. Charles . . XLVII
Hubon, Henry . . XLIII
Hubon, Henry G. . . XLIII
Hunt, T. Francis . . CXVI
Jelly, William H. . . XLIII
Jewett, George B. . . XLIII
Johnson, Emery S. . . CXXIX
Kehew, William H. . . XLIII
Kemble, Arthur . . I
Kilburn, John . . XXI

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Kimball, James S. . . XXXV
Kinsman, John . . XCIX
Kinsman, Nathaniel . CXII
Knight, Edward H. . . CIII
Lamson, Charles . . XLIII
Lamson, Frederick . . XCIX
Lincoln, Solomon Jr. . LXXV
Lord, Andrew H. . . XLVII
Lord, George C. . . XLIII
Lord, Hannah M. . . CLXXXII
Lovett, H. R. . . CXXXII
Lowd, Albert J. . . XCVIII
Mackie, John . . XLVII
Mackintire, Ingalls K. . XLIII
Manning, James . . XLIII
Mansfield, Daniel H. . XCIV
Marks, John L. . . CXXVI
Martin, William P. . . LXXXIV
McCloy, Robert . . XLVII
McDuffie, Charles D. . XXVIII
McKenzie, S. S. . . XLVII
Miller, Ephraim . . L
Mosman, A. T. . . CLVIII
Morong, Thos. . . IX
Morton, Henry . . XXXV
Moulton, William C. . XLVII
Neal, Mrs. D. A. . . XLVII
Nellson, William . . I
Newcomb, George . . L
Newhall, Ezra F. . . CXLVIII
Newhall, John W. . . XLVII
Newhall, Thomas P. . XLVII
Newhall, W. F. . . XLVII
Nichols, John H. . . XLIII
Northend, William D. . XLVII
Noyes, Amos . . XCIX
Odell, Charles . . XCIV
Oliver, Henry K. . . XLIII
Oliver, James S. . . XLVII
Osgood, Charles . . XLVII
Osgood, Jos. B. F. . . CIII
Osgood, William H. . CXLVI
Page, Jeremiah . . XXXV
Palmer, Theron . . XLIII
Parker, William B. . . XXXV
Payson, Edward H. . . XXXV
Peabody, Henry W. . . LVII
Peabody, John P. . . XLIII
Peabody, Joseph . . CLXXXII
Pearson, Benj. . . XCVIII
Peck, F. S. . . XLIII
Pepper, Charles Henry . CXII
Perkins, Daniel . . XLIII
Perkins, David . . XXXV
Perkins, Edward L . . XXXV
Perkins, Jeremiah S. . XLIII
Perkins, Thomas L. . . LXIII
Perry, Augustus . . XLIII
Pickman, Benjamin . . CLXXVII
Porter, Frederick . . XLVII
Porter, Samuel . . XLIII
Pousland, George W. . CXXXVII
Putnam, Elizabeth A. . CLVI
Putnam, Henry W. . . LXXXVI
Rea, Charles S. . . XLIII
Reith, W. Jr. . . XLIII
Rice, J. M. . . XLVII
Richardson, C. W. . . XLVII
Roberts, E. F. . . XXXV
Roberts, J. W. . . XXXV
Rogers, Richard D. . . XLIII
Ropes, Jonathan . . CXII
Roundy, Charles . . XXXV
Roundy, George . . CXLVI
Russell, Albert B. . . LXXI
Russell, George P. . . L
Rust, Francis A. P. . . CXIV
Safford, Joshua . . IV
Saltonstall, Caroline . XLIII
Sanders, Charles . . XLIII
Saunders, Thomas M. . XLIII
Savory, Tristram T. . XLIII
Sewall, Charles . . XLVII
Shaw, Xenophon H. . XLIII
Silsbee, Mrs. John H. . XLIII
Silsbee, Wm. H. . . CXXVI
Silver, Peter . . XLIII
Simonds, E. A. . . XLIII
Smith, Edward A. 2d . XLIII
Smith, J. Ford . . XXXV
Stanley, Abraham J. . XLVII
Stickney, W. J. . . XLIII
Stimpson, James C. . . L
Stone, Eben F. . . CIV
Stone, Henry R. . . VI
Thayer, Edward S. . . CXII
Thompson, Orin F. . . XLIII
Treadwell, Annie . . XLVII
Treadwell, Elizabeth W. . XLIII
Treadwell, Lucy . . LXXI
Trefren, James . . XLVII
Tucker, Jonathan . . XLIII
Tuckerman, John Francis . XLIII
Tuttle, Francis W. . . XLIII
Walden, Joseph F. . . XLIII
Ward, Elizabeth C., Jr. . XLIII
Webster, Francis C. . . XCVII
Westwood, J. . . XLVII
Wheatland, Martha G. . CLVIII
Whitaker, William . . LXIII
White, George M. . . CXXV

MEMBERS ELECTED, CORRESPONDING.

Bartlett, John R. . . CLXXXII
Bolles, Edwin C. . . LXXV
Clark, Thomas M. . . CLXXXII
Cope, Edward D. . . CXIV
Cresson, Ezra T. . . CXVI
Endicott, James B. . . I
Endicott, William . . I
Gill, Theodore . . CLXXXII
Hall, James . . CXIV
Hamlin, Charles E. . . VI
Hanaford, Jeremiah L. . IX
Hubbert, James . . LXXX
Huntington, George C. . CXXXI
Kimball, James P. . . LXXXVI
Lesquereux, Leo . . CXXX
Lewis, Winslow . . XCVIII
Morse, Edward S. . . LXXV
Mudge, Benjamin F. . IX
Norwood, J. G. . . CLX
Osten Sacken, R. . . CXIV
Owen, Richard . . CXXX
Peirce, Benjamin . . I
Poey, Filipe . . LXXXVI
Smith, Sidney I. . . VI
Soares, John da Costa . CXXIX
Talant, James . . LXXX
Ward, James C. . . XCIX
Wildes, J. H. . . XX

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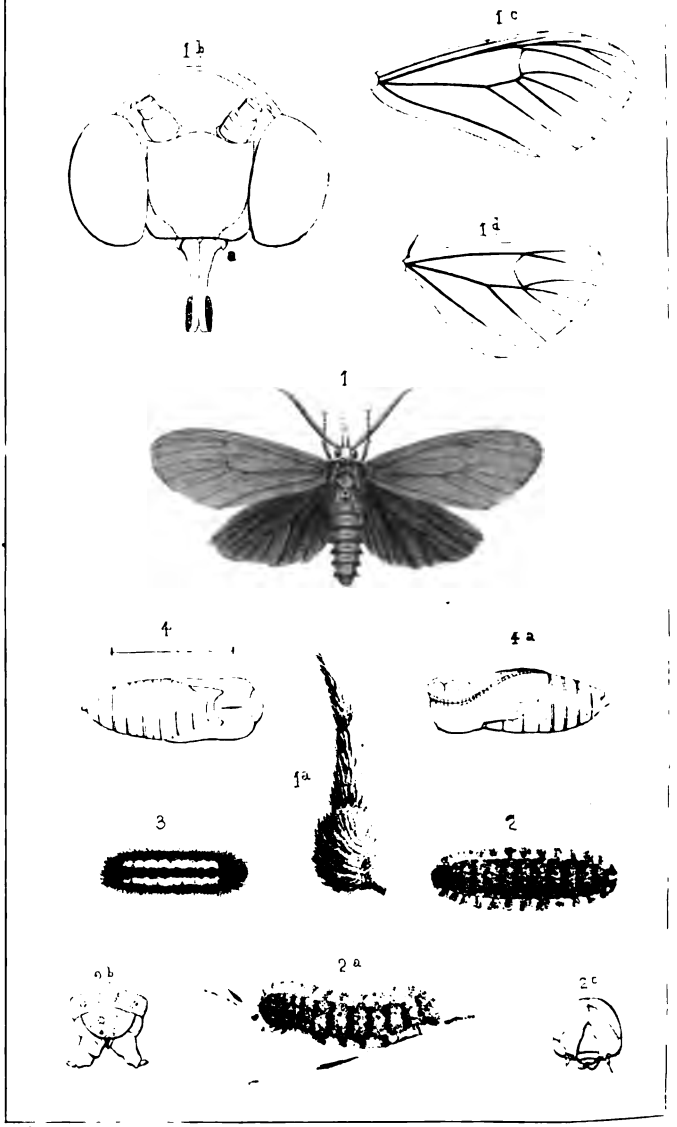

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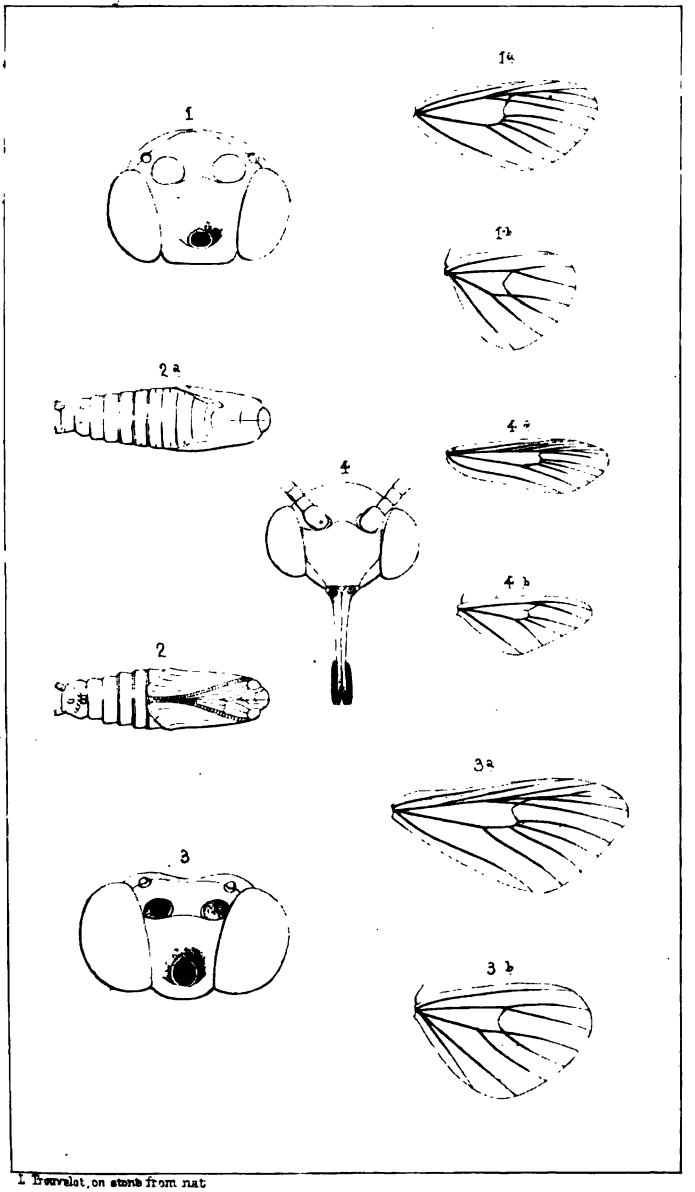

L. Prevelot, on stone from nat

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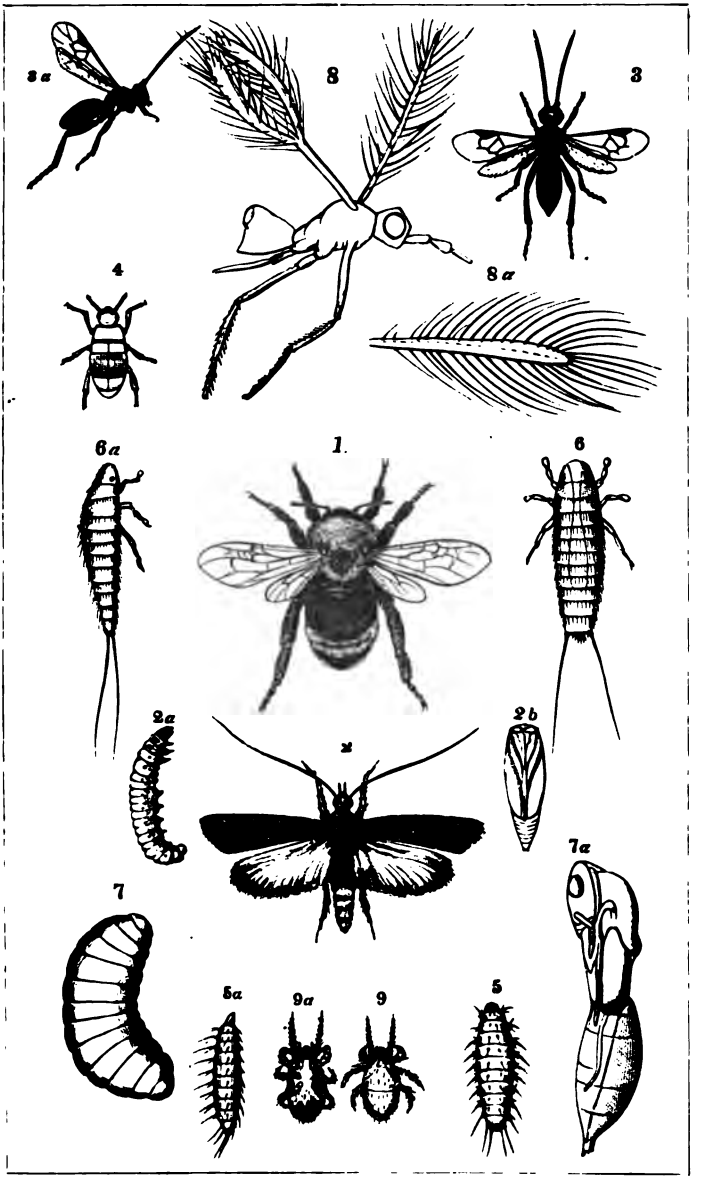

J. H. Emerton, on wood.

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1

5

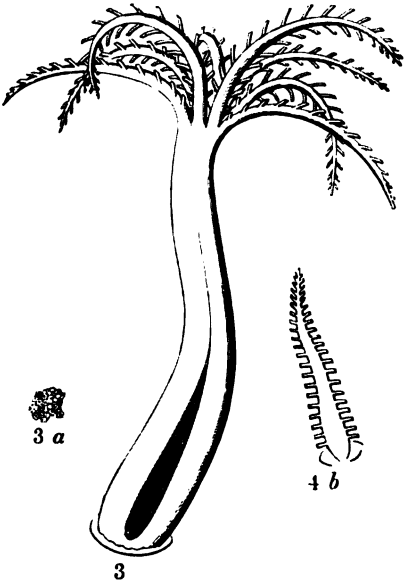
6

2

4 *a*

5 *a*

6 *a*



3

3 *a*

4 *b*

4

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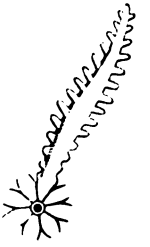
7

8 *a*

8

7 *a*

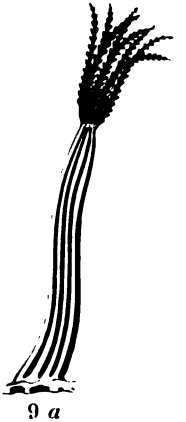
8 *b*



9 *b*

10 *a*

10 *b*



9 *a*

10

9

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Prof. H. J. Clark, E. S. Morse, and A. Hyatt, from Nat. E. S. Morse, on Wood.
A. Holland, Boston, Printer. A. E. Richardson, Portland, Me.

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PLATE 7.

FREDERICELLA REGINA Leidy, Mss.

Fig. 1.* One colony, life size, with all the branches attached. (Gorham, Me.)

Fig. 2. Two branches of one colony: one attached and one free. (Cambridge, Mass.)

Fig. 3. Attached branch of one colony. (Gorham, Me.)

Fig. 4. Magnified view of one adult zoöid. (Norway, Me.) D, ectocyst; E, endocyst; V, funiculus; M, gastric retractors; M′, lophophoric retractors; M″, brachial retractors; N, anterior retentors; N′, posterior retentors; F, brachial collar; G, calyx; H, tentacles.

Fig. 5.† Section of a young specimen, showing the internal structure and the limited extent of the invaginated fold. (Cambridge, Mass.) D, ectocyst; E, endocyst; B, invaginated fold; Y, bud; N, anterior retentors; K, œsophagus; H″, cilia; K‴, œsophagal valve; K′, stomach; K⁗, position of intestinal valve; K″, intestine; K̄, anus; I, lophophore; I′, epistome; I″, mouth; H, tentacles; F, brachial collar; S, nerve mass.

Fig. 6.† Lateral view of an invaginated specimen, showing the shape of the cœnœcial orifice. A⁗, orifice; L, region of the sphincter; D, ectocyst; E, endocyst.

Fig. 7. View of the same from above.

Fig. 8. Front view of a zoöid, showing the incipient arms and the relative positions of the muscles. M′, lophophoric retractors; M″, brachial retractors; I′, epistome.

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*This figure was drawn and presented to me by Mr. Morse.

†This figure is part of a study drawing made by Prof. H. J. Clark, and obligingly placed at my disposal by him.

‡All figures with no locality mentioned must be referred to the habitat last named; thus in Pl. 7, Figs. 6, 7 and 8 are all from the same locality as Fig. 5.

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PLATE 8.

PLUMATELLA ARETHUSA Hyatt.

Fig. 1. General view of one colony, life size, with most of the polypides retracted. (Norway, Me.) Three apertures in the ectocyst of the main trunk indicate the former positions of as many living polypides, and show this colony to have been a branch of a much larger colony, from which it has been separated by the death and disappearance of the original stock.

Fig. 2. One polypide evaginated, with a younger polypide from the same cell invaginated. D, ectocyst, E, endocyst; Y, bud; M, gastric retractors; M′, lophophoric retractors; M″, brachial retractors; M, trunks of the retractors. F, brachial collar; V, funiculus; W, statoblasts; W‴, gelatinous envelope; N, anterior retentors; N′, posterior retentors; A‴, cœnœcial orifice; L, region of the sphincter.

Fig. 4. View of the cœnœcial orifice of fig. 2, from above, showing the four broad plications of the invaginated fold. The crenulations on the border are produced by the contraction of the sphincter, and do not indicate cellular structure.

Fig. 5. Special view, showing the arrangement of the retentor muscles around the invaginated fold of the evaginated zoöid in fig. 2. The five anterior rows of the posterior retentors are contracted, and have drawn the external wall into five slightly crenulated folds. N, anterior retentors; N′, posterior retentors; L, region of the sphincter.

Fig. 6. View of the partial division between the cell of fig. 2 and the preceding polypides, formed by an infolding and thickening of the endocyst. D, ectocyst; E, endocyst.

Figs. 7, 8, 9. Upper and lower sides and profile view of the statoblast. W′, horny sheath; W″, annular sheath; W‴, gelatinous envelope.

Fig. 10. View of a dead and half decayed specimen, showing the peculiar constrictions of the cell occasioned by annular muscular bands. D, ectocyst; E, endocyst; H, tentacles; I″, mouth; L, region of the sphincter; K′, stomach; M, trunk of the retractors.

PLUMATELLA DIFFUSA Leidy.

Fig. 11. An old colony of life size, with but few living polypides. (Cambridge, Mass.)

Fig. 12. Enlarged lateral view of a branch from a younger colony, showing different degrees of invagination. First cell on the left has even the upper pliable part of the ectocyst drawn in; second cell is vacant, the polypide and softer parts having entirely decayed; third, fourth and sixth cells show different degrees of invagination.

Fig. 13. Enlarged view of another variety of this species with all the polypides retracted.

Fig. 14. Enlarged ventral view of the expanded crest of a polypide from fig. 13. M′, lophophoric retractor; M″, brachial retractors.

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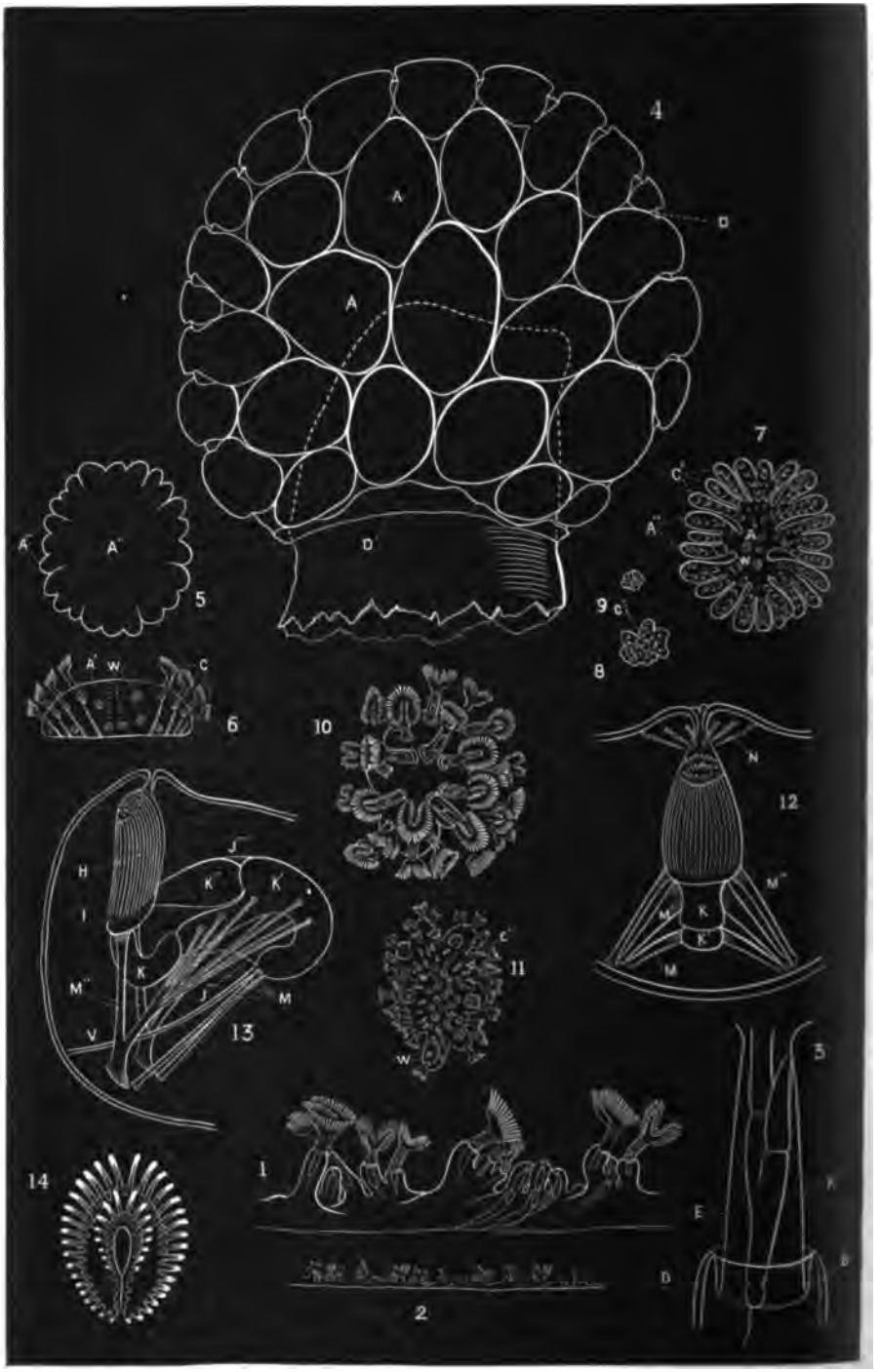

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PLATE 9.

PLUMATELLA VITREA Hyatt.

Fig. 1. Enlarged view of five groups on one branch, corresponding to the first five on the left of the branch below, fig. 2. (Cambridge, Mass.)

Fig. 2. View of one branch, natural size.

Fig. 3. Shows the great extent to which the polypide is often evaginated. D, ectocyst; E, endocyst; B, invaginated fold; K′, stomach.

PECTINATELLA MAGNIFICA Leidy.

Fig. 4. Outline of a mass gathered on the stump of a dead branch. (Norway, Me.) The outline of the branch where it is covered by the mass, is indicated by a dotted line. This figure shows the general aspect of the mass, the great thickness of the ectocyst, and the general arrangement of the colonies. A, outlines of cœnœcia; D, ectocyst.

Fig. 5. The outline of a colony, natural size, from a large mass, showing the radiating and tripartite character of the lobes. A′, cœnœcial trunk; A″, cœnœcial lobes, divided into three minor lobes.

Fig. 6. Ideal transverse section of the same, with the polypides expanded. W, statoblasts; A′, cœnœcial trunk; C, polypide.

Fig. 7. The colony represented in the outline of fig. 5, after being treated with alcohol. C′, dead and retracted polypides; A′, cœnœcial trunk; A″, cœnœcial lobes; W, statoblasts.

Fig. 8. Younger colony, showing the central polypide.

Fig. 9. Young colony, showing the genesis of five polypides, the progenitors of an equal number of branches, from the central polypide.

Fig. 10. A young colony enlarged, showing the arrangement of the polypides. (Cambridge, Mass.)

Fig. 11. A very old colony; the cœnœcial trunk occupied by numerous statoblasts, and the half absorbed remains of dead polypides. W, statoblasts; C′, dead polypides.

Fig. 12. Ventral view of a closely retracted polypide, showing the positions and relations of the three pairs of retractors. (Norway, Me.) K′, bottom of the stomach; K, part of the œsophagus; M, gastric retractors; M′, lophophoric retractors; M″, brachial retractors; N, anterior retentors.

Fig. 13. Lateral view of a retracted polypide, showing the aspect of the fourth membrane and of the retractors during the process of invagination. J″″, fourth membrane of the alimentary canal; M, gastric retractors; M″, brachial retractors; V, funiculus; K, œsophagus; K′, stomach; K″, intestine; I, lophophore; H, tentacles.

CRISTATELLA OPHIDIOIDEA Hyatt.

Fig. 14. View from above of the lophophore of an immature polypide. The arms are still joined near the extremities, and the tentacles and calyx along the line of the juncture remain undeveloped. (Norway, Me.)

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PLATE 10.

PECTINATELLA MAGNIFICA *Leidy.*

Fig. 1. Enlarged view of one polypide situated at the end of a lobe. (Norway, Me.) The full adult growth of the terminal tentacles is not yet attained. They become about one-third longer in the adult. A″, cavity of the cœncecial lobe; D, common ectocyst; E, endocyst of the cœnœcium and polypide; J̄, hepatic folds; M′, lophophoric retractors; M″, brachial retractors; N, anterior retentors; N′ posterior retentors.

Figs. 2, 3, 4. The upper and lower side, and profile of the statoblast. W′, horny sheath; W″, annular sheath; W‴, spines.

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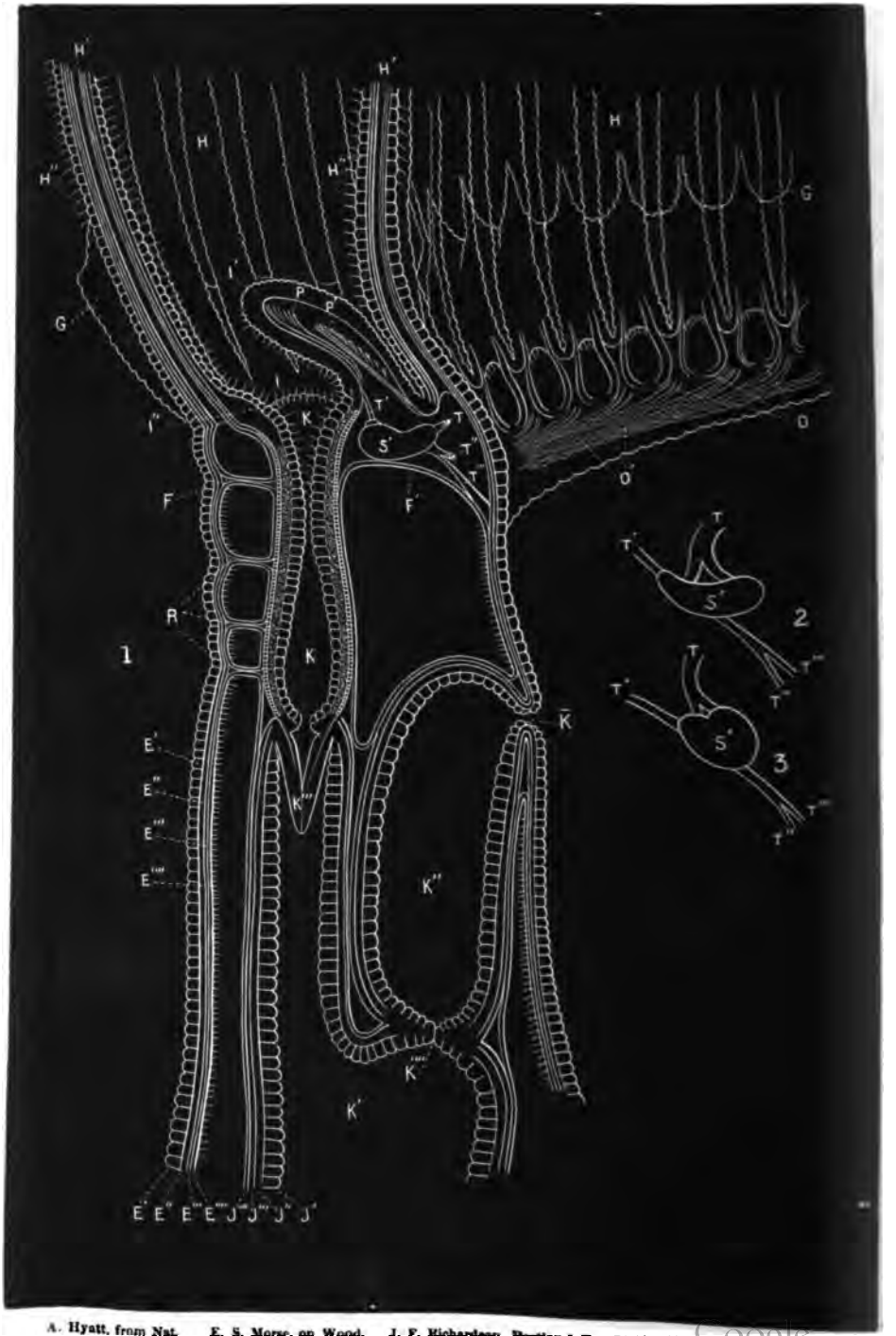

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PLATE 11.

PECTINATELLA MAGNIFICA Leidy.

Fig. 1.* Enlarged longitudinal section exhibiting a portion of the left arm and the left side of the body, of a polypide. The ganglion, however, is from the right side of the body, towards the observer, and is supposed to be pressed inwards, and away from the observer, in order to show its relation to the neural partition and the polypidal nerve. (Norway, Me.) H, tentacles; H′, tubular interior of the tentacles; G, calyx; H″, cilia; O, bases of the outer tentacular bands; O′, fibres of the inner tentacular bands, seen from the outside; I′, epistome; P, one-half of the median muscle of the epistome; P′, left lateral muscle of the epistome; R, parietal fibres, probably abnormal, enveloped by the fourth membrane; I, lophophore; I″, mouth; E′ the first, E″, the second, E‴, the third, and E⁗, the fourth membrane of the endocyst; F, brachial collar; F′ neural partition; K, œsophagus; K′, stomach; K″, intestine; K‴, œsophagal valve; K⁗, intestinal valve; K̄, anus; J′, the first, J″, the second, J‴, the third, and J⁗, the fourth membrane of the alimentary canal; S′, right ganglion; T, right lophophoric nerve trunk severed near the base; T′, right epistomical nerve trunk; T″, right brachial nerve trunk severed near the base; T‴, right polypidal nerve trunk.

Fig. 2. Enlarged ganglion of another specimen from the same colony as fig. 1, showing the extreme variability of the ganglia and nerve trunks. T, right lophophoric nerve trunk; T′, right epistomical nerve trunk; T″, right brachial nerve trunk; T‴, right polypidal nerve trunk.

Fig. 3. Shows the same ganglion contracted, the nerve trunks indicated by the same letters.

* This figure is composed from numerous drawings of different individuals. The number of the membranes in the tentacles, as has been explained in the text, was inferred but not observed.

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PLATE 12.

PECTINATELLA MAGNIFICA Leidy.

Fig. 1.* Front view of a polypide much enlarged, with the arms removed, showing the under side of the lophophore. (Norway, Me.) E, endocyst; B, invaginated fold; H′, tubular base of the tentacles; $\bar{Z}$, clear spaces in the endocyst; L′, brachial contractors; $\bar{M}$, position of the lophophoric flexor; I′, outline of the epistome; S, nerve mass; T, lophophoric nerve trunks; T″, brachial nerve trunks; T‴, polypidal nerve trunks; K, œsophagus; K‴, œsophagal valve; K′, stomach; K⁗, intestinal valve; K″, intestine; $\bar{K}$, anus; M′, lophophoric retractor; M″, brachial retractors; F, brachial collar; N, anterior retentors; N′, posterior retentors.

Fig. 2. Lateral view of a portion of the inside of one of the arms, showing the fibres of the inner and outer tentacular bands. H, bases of the tentacles; $\bar{Z}$, clear spaces in the endocyst; I, lophophore; E′, the first, E″, the second, E‴, the third, and E⁗, the fourth membrane of the endocyst; O, bases of the outer tentacular bands; O′, fibres of the inner tentacular bands. The third membrane, E‴, is lifted from the second, E″, by the action of the lower fibres of the brachial contractor, which also form the knee-like ridge at L′.

* This figure is composed from numerous drawings of different individuals.

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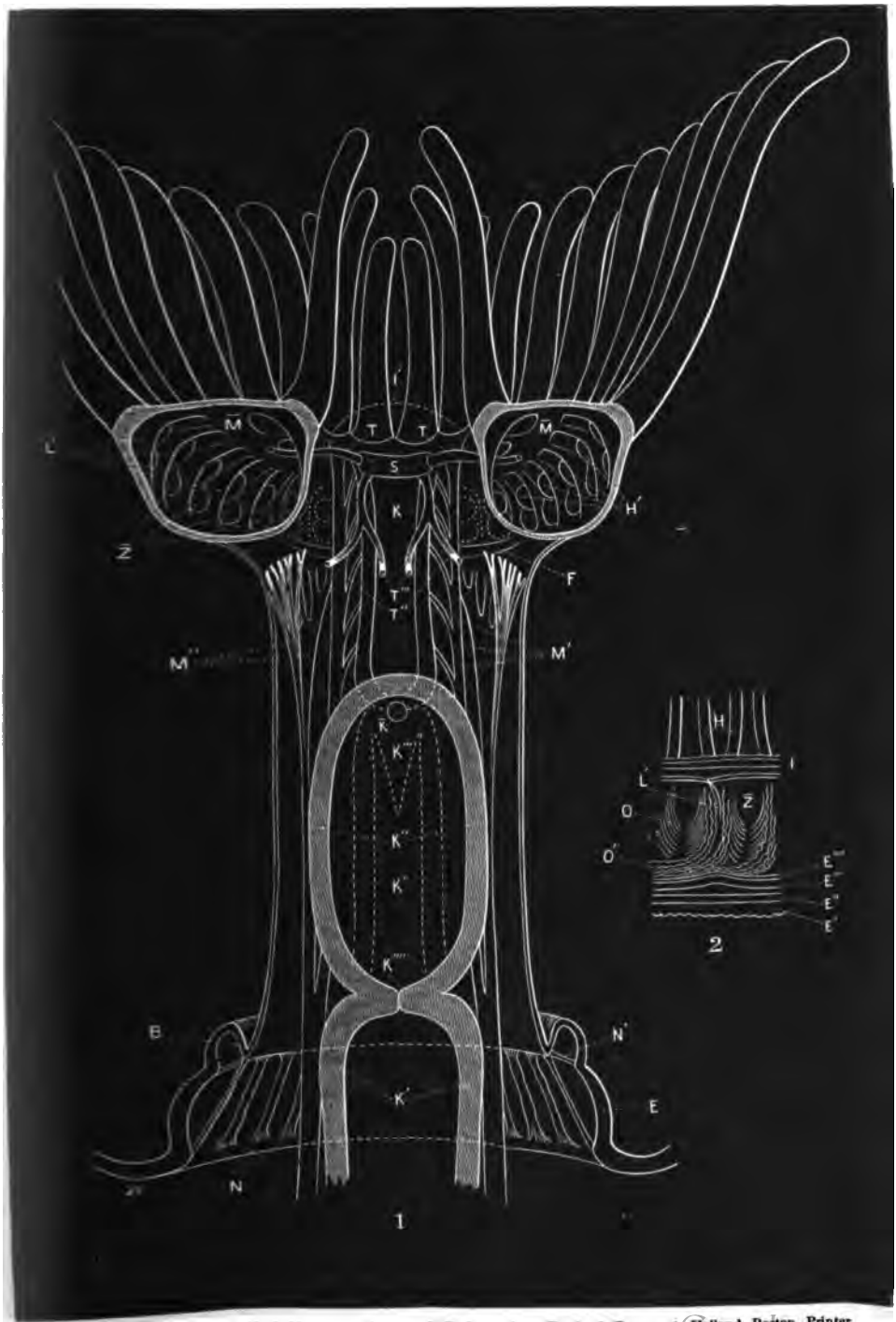

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PLATE 13.

CRISTATELLA OPHIDIOIDEA Hyatt.

Fig. 1. A colony of natural size in its natural position. The polypides are figured at the ends only, the outline of the colony between them being indicated by dotted lines. (Norway, Me.)

Fig. 2. Enlarged view of the underside of one-half of a young colony with the ectocyst and endocyst removed from a portion of the base, disclosing the stomachs of the polypides and the bases of the muscular walls. On the border are the buds attached to the upper side of the endocyst, and in the centre is the inverted cone formed by the interior edges of the muscular walls. On the left, the uncovered portion, the white lines show the positions of the muscular walls, but on the right, the covered portion, they show only the temporary external folds of the endocyst caused by the contraction of the cœnœcium. The relations and positions of all these parts are best explained by reference to the ideal section of this colony, as depicted in fig. 3, the lettering being the same in both; with the exception of K′, stomachs of adult polypides partially retracted, and †, stomach of an evaginated polypide in fig. 2; and D, ectocyst in fig. 3.

Fig. 3.* E, endocyst; C, stomach of polypides wholly retracted; Q, muscular walls; Y, buds; Y′, immature polypides, capable of evagination; † X, fixed statoblasts; A′, cœnœcial trunk.

Fig. 4. View from above of a portion of the border of the same colony when expanded to about twice the vertical height of fig. 3. Lettering same as in preceding figures, with the exception of A″, cœnœcial tubes, and A‴, cœnœcial orifices. Some of the latter are closed, and some, indicated by dotted lines, are open; the polypides, however, are omitted from the latter, in order to give a better view of the cœnœcium.

Fig. 5. Enlarged cœnœcial cell of the first row, the orifice closed over the invaginated polypide. A‴, cœnœcial orifice; Q, attachments of the muscular walls of the cell; N, anterior retentors.

Fig. 6. Transverse section of the same, viewed from the ventral side. A‴, cœnœcial orifice; Q, muscular walls; N, anterior retentors; H, tentacles.

Fig. 7. View of a fully invaginated polypide of the first row, from below, with the endocyst removed from that side. The gastric and part of the lophophoric retractors, have been entirely omitted. A‴, cœnœcial orifice; Q, muscular walls; M, trunk of retractor muscles; K′, stomach.

---

* When this figure was drawn, I had, as I supposed, observed three rows of full grown polypides on the cœnœcium as in fig. 2. This, however, is probably erroneous, and I doubt whether at any time of the life of the colony, there are more than two living rows of fully grown polypides and one row of immature polypides. In this section, therefore, the innermost rows should have been represented in a retracted condition, the polypides dead and partly absorbed.

† For a magnified view of crest from above, see Pl. 9, fig. 14.

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Fig. 8. A tube isolated and viewed from the lower side. Y, bud attached to the upper endocyst; X, young, fixed statoblast attached to the lower endocyst; Q, cœnœcial walls; $\bar{Q}$, base of membranous ridge; E, endocyst.

Fig. 9. Two figures of the same statoblast, showing the variations in the form and position of the vacant spot in the statoblast of fig. 8.

Fig. 10. View of the same from the upper side, showing the membranous ridge crossing the statoblast and apparently connecting with the endocyst on the upper side.

Fig. 11. An older specimen, in which the ridge has formed a tube.

Fig. 12. A still older specimen, from the interior of the cœnœcium, showing the elliptical depression in the horny sheath.

Fig. 13. View of the lophophore from above, with the tentacles and calyx removed, showing the distribution of the nerves. H, bases of the tentacles; G, calyx; $\bar{M}$, lophophoric flexor; U, lophophoric nerve branches; U′, tentacular nerve branches; I′, epistome; I″, mouth.

Fig. 14. Epistome isolated and viewed from above, showing the muscles. P, median muscle; P′, lateral muscles.

Fig. 15. Lateral view of a portion of the interior of one arm with the lophophore removed, showing the outer and inner tentacular bands, and the membranes of the endocyst in an alcoholic specimen. O, outer tentacular bands; O′, inner tentacular bands.

Fig. 16. Direct and profile views of a group of cells from the first membrane of the cœnœcial endocyst of fig. 2.

PLATE 14.

Cristatella ophidioidea Hyatt.

Fig. 1. Magnified view of an adult polypide in its cell. E, endocyst; Q, muscular walls of the cell; M, gastric retractors; M′, lophophoric retractors; M″, brachial retractors; N, anterior retentors; $\bar{Z}$, clear spaces in the endocyst between the bases of the outer tentacular bands; O, bases of outer tentacular bands.

Figs. 2, 3, 4. Upper and lower side, and profile view of statoblast. W′, horny sheath; W″, annular sheath; W‴, spines. Of the last, there are in nature twenty-two short, and thirty-two long ones.

Fig. 5. View of the anus, showing its oblate form, and also the great breadth of the intestine, when compared with the œsophagus and the upper part of the stomach in the back ground; K, œsophagus; K′, stomach; K″, intestine; $\bar{K}$, anus.

Fig. 6. Section of stomach, showing the hepatic folds. $\bar{J}$, hepatic folds.

Fig. 7. Oblique view of the tip of a tentacle, showing the fan-shaped attachments of the tentacular bands.

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COMMUNICATIONS

READ BEFORE

THE

ESSEX INSTITUTE.

VOL. IV.

1864–5.

[Issued Quarterly with the Proceedings.]

SALEM:

PUBLISHED BY THE INSTITUTE.

1866.

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PLATES.

Plate 1, accompanying Dr. Packard's Paper, explanation on p. 47.
" 2, " " " " " " p. 47.
" 3, " " " " " " p. 140.
" 4, " Mr. Morse's " " " p. 180.
" 5, " Prof. Verrill's " " " p. 195.
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Plates 7, 8, 9, 10, 11, 12, 13, 14, accompanying Capt. Hyatt's Paper, have the explanations opposite each plate.

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ERRATA TO COMMUNICATIONS.

Page 9, line 14, *for* Phalsænidæ, *read* Phalænidæ.
" 11, " 12, after *Agaristidæ*, *insert* a comma.
" 12, " 6, *for* lignivorus, *read* lignivorous.
" 12, " 30, " strangly, *read* strangely.
" 13, " 36, " Tortriidæ, *read* Tortricidæ.
" 15, heading, for ZYGÆNIDIA, *read* ZYGÆNIDÆ.
" 15, line 24, for Zyæginidæ, *read* Zygænidæ.
" 16, " 8, " maxillary, *read* labial.
" 22, " 11, " gives, *read* give.
" 48, " 18, " *Coccyzus*, read *Coccygus*.
" 49, " 42, " ninety-two, *read* one hundred and one.
" 50, " 18, *for* June, *read* May.
" 51, " 1 of foot note, *for* 1728, *read* 1788.
" 56, " 1, for *Pallacii*, read *Pallasii*.
" 60, " 9, and following pages, for *Dendroica*, read *Dendrœca*.
" 61, 92 and 95, for *Siurus*, read *Seiurus*.
" 69, " 18, for Chickedee, *read* Chickadee.
" 69, " 39, " *Astrigalinus*, read *Astragalinus*.
" 70, " 11, " *linaria*, read *linarius*. [*censis*.
" 73, " 9, " *Siurus noveboracen·is*, read *Seiurus novæbora-*
" 73, " 16, " *illiaca*, read *iliaca*.
" 78, ". 4, " *Tringites*, read *Tryngites*.
" 80, " 28, " *Pedeœthya*, read *Pedeteœthya*.
" 83, " 7, " *Myioioctes*, read *Myiodioctes*.
" 83, " 13, " *Myiodiœtes*, read *Myiodioctes*.
" 86, " 12, " *Octhodromus*, read *Ochthodromus*.
" 87, " 25, " *noveboracensis*, read *novæboracensis*.
" 87, " 36, and p. 94, No. 27, for *Gambellii*, read *Gambelii*.
" 89, " 12, for *erythrorhyncus*, read *erythrorhynchus*.
" 89, " 36, " Temn., *read* Temm.
" 90, " 5, " Skau, *read* Skua.
" 91, " 18, " *troile*, read *troille*.
" 92, No. 39, and p. 94, No. 4, for *Pallassi*, read *Pallasii*.
" 92, Nos. 51 and 52, *for* Dandroica, *read* Dendrœca.
" 92, No. 72, *for* Harporynchus, *read* Harporhynchus.
" 93, No. 116, and p. 96, No. 93, *for* Squartarola, *read* Squatarola.

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" 94, " 1, *for* Hypotryorchis, *read* Hypotriorchus.
" 96, " 57, " Harporhyncus, *read* Harporhynchus.
" 96, " 99, " lacticauda, *read* laticauda.
" 104, " 24, and page 108, line 30, *for* Byturus, *read* Antherophagus.
" 131, " 9, *for* Mezercon, *read* Mezereon.
" 131, " 11, " nest, *read* net.
" 131, " 25, *after* female, *insert* situated almost wholly.
" 132, " 15, " abnormal, *insert* a.
" 175, " 29, *for* anterior pole, *read* posterior pole.
" 180, lines 12—18, *for* anterior end, *read* posterior end.
" 209, line 9, *for* trunk *read* trunks.
" 218, " 38, " cardiac and pyloric, *read* œsophagal and intestinal.
" 219, " 1, " Œsophagal Retractors, *read* Lophophoric Retractors.

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COMMUNICATIONS.

1864.

(Communications on Historical subjects are printed in the "Historical Collections of the Essex Institute.")

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I.—*On the Sodalite at Salem, Mass.*

By D. M. Balch.

(Communicated February 8, 1864.)

The occurrence in our neighbourhood of this rare silicate was first noticed in Oct. 1855, by G. L. Streeter Esq., and others. The locality was the recently opened syenite quarry, on the right hand side of the road leading along Collins' Cove, from the Alms House to Hospital Point Peculiar bluish stains in a block of stone from the quarry having attracted the attention of these gentlemen, a search was instituted which resulted in the discovery of the remains of a vein of elæolite and orthoclase, in which were imbedded amorphous masses of the blue mineral, sodalite. Unfortunately this vein, once extensive, had been mostly quarried and carted away by the workmen, and, though it yielded some fine specimens, was soon exhausted.

An account of the discovery of this mineral and some discussion thereon (in which it is erroneously called cancrinite,) can be found in the Essex Institute Proceedings, Vol. I, p. 153—155; also a more extended description and analysis, by J. P. Kimball in Silliman's Journal; 1860, Vol. xxix. p. 65.

I visited the above locality in the autumn of 1858, and traced the vein some distance, until it was reduced to a mere seam; I noticed at that time several characteristics, rendering it highly improbable that the Salem mineral had a common origin with that of Litchfield, Me., its only other locality in the States. At the place last mentioned sodalite occurred disseminated through an erratic block, and associated with elæolite, citron-yellow cancrinite, and zircons of unusual size and excellence (all long since exhausted,) while at the Salem locality it was found imbedded in a vein of elæolite and feldspar, with very small zircons, biotite, marcasite, plumbago, &c.; but no trace of cancrinite, the most conspicuous of all in the Maine group,

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was present. Moreover, although not enough of the vein remained for accurate observation, I was of opinion that it was not peculiar to chance boulders, but a true vein in the ledge.

An analysis, performed at that time, (Sept, 1858,) afforded me results, which, as they have never been published, are given below:

Silicic Acid.	37.69
Alumina.	32.31
Soda.	24 80
Chlorine.	6.17
Ferrous Oxyd.	trace.

This agrees well with the recognized formula for Sodalite, $3\,(NaO\,SiO_2 + Al_2\,O_3\,SiO_2) + Na\,Cl$, except that the amount of Chlorine is a little too low.

In April, 1862, while examining the ledges on the left hand of the road I discovered quite an extensive vein of elæolite, situated about 10 rods N. W. from the old locality, and nearly at right angles with it. This new vein varies in width from a few inches to a foot, or more, and runs irregularly along the face of the ledge for 30 or 40 feet. It is composed of orthoclase and greenish elæolite, large imperfect crystals of black hornblende, biotite, zircon, flakes and filiments of graphite and several other minerals in small quantity; there is no sodalite near the surface; it first begins to appear at the depth of 1½—2 feet. This vein was blasted in its widest part this autumn by Mr. C. H Higbee and myself, and yielded us some very fine specimens of sodalite, varying in colour from violet to azure blue, and subtransparent. I have analysed carefully selected specimens of both sodalite and elæolite from this vein with the following results:

Sodalite; very dark blue. Sp. Gr=2.30. Two portions a. and b. were analysed.

	a.	b.	Results.
SiO_2	37.64	37.44	37.54
$Al_2\,O_3$	32.13	32.16	32.15
NaO	24.57	——	18.94
Ca O.	.35	——	.35
Na.	——	4.18	4.18
Cl	——	6.45	6·45
			99.61

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The composition of sodalite, calculated from the formula given on the preceding page is as follows:

$3Na\ O$,	93	=	18.98
$3Al_2\ O_3$,	153.78	=	31.38
$6SiO_2$,	184.86	=	37.72
Na,	23	=	4.69
Cl,	35.46	=	7.23
	490.10		100.00

with this the results obtained by analysis agree quite closely. It is worthy of note, that although the specimen employed was unusually deep coloured, scarcely appreciable traces of iron were detected; the alumina thrown down from its solution in aqua regia was white, and most of the reagents for iron gave negative results; it is therefore very doubtful if this mineral owes its color to iron, as has been supposed.

Elæolite The elæolite of this locality is filled with minute specks, probably mica or feldspar, from which it cannot be separated mechanically; this impurity amounts to about 3 per cent., and remains behind when the levigated mineral is dissolved in acids. The elæolite occurs in compact masses, of a light green colour and greasy lustre; in connection with orthoclase it forms the bulk of the vein; it has not yet been observed in crystals. Heated before the blowpipe it fuses and gives off a little moisture. Dried at about 150° C. it has the following composition:

Silicic Acid	44.32
Alumina	32 69
Soda	17.02
Potassa	.5 09
Lime	.59
	99.71

It also contains slight traces of iron. A portion dried at 100° C. and then ignited lost 1.31 per cent.

The sodalite is found near the centre of the vein in thin layers. There is no doubt that this locality will furnish fine cabinet specimens when more deeply explored. As the vein strikes downward at a very acute angle, extensive blasting will be necessary; however it well deserves a thorough exploration, for,

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apart from the circumstance that this is the only American locality known, the silicate is quite scarce elsewhere. Its foreign localities are Greenland, Norway, Siberia, &c.; it is almost invariably associated with elæolite, but the latter mineral often occurs unaccompanied by sodalite.

I am at present occupied with the examination of several unrecognized minerals, which are disseminated in minute quantities through the vein. From slight indications it is probable that cancrinite may yet be met with; it has not been found at either the old or new localities. The largest zircon that I have seen measured about one-third of an inch in diameter.

Salem, December, 1863.

II. *On Magnetite, and an Unknown Mineral at Nahant.*

By George H. Emerson.

(Communicated February 8, 1864.)

Besides the minerals mentioned by Dr. Prescott in his list, communicated to the Essex County Natural History Society, in the year 1839, as occurring at Nahant, I noticed, while there last summer, that magnetite was abundantly disseminated through the diorite near "Spouting Horn," and also in a similarly constituted, but more finely grained rock, a little to the West of "Pulpit Rock." In both places it is associated with chalcopyrite and iron pyrites, and in both I found small, but tolerably perfect, octahedral crystals, though it is, for the most part, amorphous.

A recent examination of a specimen of the greenstone from the locality last named, disclosed to me a crystalline mineral which I did not recognize, and whose external characters failed to identify it. It was too imperfect to determine the form, or even with certainty, the crystalline system to which it belonged, though its cleavages, three in number, led Prof. Cooke to refer it to one of the inclined systems.

The color was a dull purple on one face, and greenish gray on the other; lustre, waxy to pearly; streak, yellow; hardness, about that of calcite. The quantity was altogether too minute

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to take the specific gravity, or to admit of many chemical tests. Before the blowpipe it fused quietly on the edges to a gray enamel, imparting an indistinct reddish-yellow color to the flame, which changed to green upon moistening the assay with nitric or sulphuric acid. With the sodium test, however, it did not give phosphuretted hydrogen. On platinum wire, with borax, the presence of iron and lime were indicated. It dissolved in nitric and hydrochloric acids with effervescence, with the exception of a slight, black, granular residue, insoluble even on the application of heat. Heated alone in the closed tube there was no trace of water. So far, its blowpipe characters seem to be as anomalous as its general appearance.

It should be remarked, by the way, that the greenstone to which I have last alluded, forms a *dike* in what is known as the "coralline formation," while that from the vicinity of "Spouting Horn" is the *metamorphic* or stratified variety of diorite. The latter contains so much magnetic iron as to have a very decided influence on the needle. Indeed, in the specimens I have examined, the rock seems to owe its dark color and high specific gravity (very nearly three) fully as much to the magnetite, as to the hornblende, which enters into its composition.

Cambridge, January, 1864.

III. *Notes on the Family Zygænidæ.* By A. S. Packard, Jr.

(Communicated February 22, 1864.)

The primary object of the writer in preparing this paper was to give as full an account as possible of the transformations of *Ctenucha virginica*, and the systematic position of the genus *Eudryas*. The very close resemblance of the early stages of the former genus to the Arctians both in structure and habits, and the fact that the genus has been recently placed among the Bombycidæ by some authors, affords us an opportunity of discussing the characters of the Zygænidæ in contrast with the allied families. For this purpose it has been necessary to study the typical European genera in connection with the American types of the group. For most of my material I am indebted to Messrs. F. G. Sanborn, Boston, Mass; A. R. Grote, New

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York; F. W. Putnam, who collected the larvæ and pupæ of *Eudryas grata*, in alcohol at Bridport, Vt., which are now in the collection of the Museum of Comparative Zoölogy at Cambridge; and for specimens of *Castnia* to the collection of the Essex Institute.

Besides the interest excited by the discovery of the transformation of any member of this family of moths, the near relationship of Ctenucha to the Bombycidæ attracts our attention. This genus when in the larval stage, so closely resembles the Arctians, as to have misled us wholly as to its nature upon first meeting with it. Indeed we were convinced that we had found a larva of *Phragmatobia rubricosa* Saunders and were much surprised at raising Ctenucha from it. On the other hand the moth has been referred by Walker to the Lithosiidæ. Here we see such a delicate balancing of analogical and structural features, that different writers do not agree which natural group to refer the object to. Thus those who place Ctenucha among the Lithosians (the highest sub-family of Bombycidæ) think of course, that the Zygænid characters which the moth possesses are those of analogy, while those of a contrary mind judge the same moth to be a Zygænid with the less essential features borrowed from the Bombycidæ. This leads us to the enquiry, how far analogy differs from affinity. It is evident that the relation is only relative and not absolute. Typical animals are those having the greatest mass of characters to isolate them from others For instance, among the Zygænidæ, the Fabrician genus Zygæna is the *type* of the family, just as in the Bombycidæ, *Telea Polyphemus* Hübner, or, still better, *Attacus Atlas* Linn, are the types of that family. In *Zygæna* we have forms the most unlike other genera of its family. There is not a character drawn from its structure or habits which is not *sui generis*, original, unique. It is the pattern upon which the family form is moulded, and the moment the form is slightly modified, and any resemblance to some other moth is superadded, as in *Syntomis* which already begins to show Lithosian affinities, that moment something has gone from it. There is a loss in affinity, and what is thrown in to supply the vacancy is a gain in analogy.

In the genus *Attacus* we have massed together a number of characters which are those of pure *affinity* (using the term in its technical sense, otherwise it has no meaning in specifying

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what is typical.) This is without doubt the most isolated group in the whole family. If we step higher or lower we find changes of form introduced which, slight as they are, detract from the singleness of the type. *Bombyx mori* the silk-worm, stands next above, in the adjoining subfamily Bombycinæ. But the larva is greatly elongated, with a slight tubercle on the end of the body, being in fact sphingiform. The moth has short narrow falcate wings, which are no longer than the body. Attacus has falcate wings, but they are very broad and are three or four times the length of the body, while the larva is short, large and plump. The next step below is *Tropæa Luna* Hübner. This is colored green and the hind wings are "tailed." The family color is brown, not green, and the "tail" is borrowed from Papilionidæ, Lycænidæ and Phalsænidæ. If we descend further down in the scale we find *Hyperchiria Io* Walker, possessing manifest analogies to Clisiocampa in the elongated body of the larva, the pupal form and the outlines of the imago.

The genus Eudryas stands at a nearly equal distance from the beginning and end of its group, and is still loaded down with features which are so unlike Alypia to which it is in reality closely allied, that Harris refers it to the Notodontians, though fully acquainted with its larva, and Walker refers it to the Noctuidæ. Its coloration is most deceptive, since the species instead of being blue or green, are white with yellow, green and purple markings. The body is unusually hairy, the antennæ are filiform as in the Noctuidæ, the legs tufted as in *Pygæra*, *Datana* and allies, and the metallic scales on the thorax are only found so far as we know in *Tolype*.

The first attempt to group the Fabrician genera Procris and Zygæna was that of the authors of the *Wiener Verzeichniss** in 1801. They divide the Linnæan genus Sphinx into seven groups of which the last, "G," "*Sphinges maculatæ*," comprises the Zygænidæ, thus making it equivalent to all the Ægeriadæ, and to any one of their five groups of the true Sphinges, i. e. the genera Sphinx, Smerinthus, &c.

* Syst. Verz. der Schmetterlinge Wiener Gegend. Illiger's ed. Wien. 1810. Vol. I, p. 38.

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In 1807 Latreille* first under the family name *Zygænides* groups into three sub-divisions: I. Sesia, Thyris, Zygæna, and Syntomis; II. Procris and Atychia, and III. Glaucopis, Aglaope and Stygia. He places *Castnia* however among the Sphingides, placing it at the head of the family, and next to Hesperia. Afterwards according to Klug.† in the article "Papilio" in the "Encyclopedie methodique," by Latreille and Godart the group "Hesperi-Sphinges" was formed for Castnia and Agarista, and they were still placed before the Sphingides. Also in the "Familles naturelles du Règne Animal," 1825, we see the Hesperi-Sphinges isolated as a distinct "tribe" equivalent to the "tribe" Sphingides, and standing at the head of the "family" Crepuscularia.

Hübner has shown more than any other writer how important a guide in arranging the Lepidoptera is their style of coloration, and how useful it is in distinguishing genera. Relying upon this character perhaps more than any other, this bold innovator‡ sub-divided the Lepidoptera into generic groups which are now commonly received; thus showing an appreciation of the modern idea of a genus, far in advance of his time. Depending however too much on slight characters, his *groups* of genera are often forced and unnatural.—The Zygænidæ are placed in the same order as observed by Latreille.

Hübner places them at the head of his second "phalanx" Sphinges, composing the tribe "*Papilionides*" which is a group equivalent to the *Sesiæ* Hübner (Ægeriadæ of authors,) and also to the "*Sphinges legitimæ*" Hübner. It embraces three "stirps;" i.e. I. *Zygænæ* for the single genus Zygæna. II. *Chrysaores* which includes Procris, Atychia and Syntomis, and III. *Glaucopes*, for Glaucopis and a large number of its allies.

He placed *Castnia* however, among the butterflies, immediately after Colias, and *Alypia* among the Pyralidæ, next to *Ennychia* which it closely resembles in its coloration.

In 1829, Boisduval§ while following Latreille in excluding

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* Genera Crustaceorum et Insectorum. Tom. IV, p. 211.

† Ueber die Lepidopteren-Gattung Synemon. Abhand. Konig. Acad. der Wissenchaft. Berlin. (1848.) 1850. p. 251.

‡ Verzeichniss bekannter Schmetterlinge. Augsburg, 1816. 8vo.

§ Essai sur une Monographie des Zygénides. Paris, 1829. 8vo.

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the *Castniares* Boisduval, and placing the Sphingidæ between these and the Zygænidæ, goes a step farther in establishing the group "*Procrides*" consisting of those genera provided with pectinated antennæ. He considers the group as equivalent to the *Sesiares* (Ægeriadæ), to the Castniares and likewise the Zygænidæ. The elimination of Sesia and Thyris is an improvement upon Latreille.

In 1832, Newman* divides the Zygænidæ into Stygiides, Ægeriites and Glaucopites.

In 1839, Dr. T. W. Harris† like the author just quoted divides the "Sphinges adscitæ" Linn, into three families, i. e. *Agaristidæ Zygænidæ* and *Glaucopidæ* which last name must be a synonym of Biosduval's "Procrides," since it is used in exactly the same sense.

The year after, Westwood‡ under the term *Uraniidæ* adopts a provisional arrangement of Urania with Castnia and allies. He rejects the name Zygænidæ, using instead Anthroceridæ Westwood, since Stephens had already rejected Zygæna, "the name Zygæna having been preoccupied in Ichthyology." This is probably an error, since Latreille's name has priority over Cuvier's.

Of all the writers upon the Castniares, Klug has been the most thorough. His article "Ueber die Lepidopteren-Gattung Synemon,"§ is a positive addition to our knowledge of these moths. Besides the quite full historical account of the group, and the descriptions and good figures of new species of the Australian genus *Synemon* Doubleday, we have a mass of new facts concerning the comparative structure of the genus above named, and very precise information about the transformation of the South American genus *Castnia*, fully confirming the observations of Madam Merian, which had been doubted by Westwood, together with important remarks on the classification of the whole group to which these two genera belong. With Boisduval he agrees in throwing Urania out of the group and

*Ent. Mag. Vol. I., p. 67.

† Descriptive Catalogue of North American Insects belonging to the Linnæan genus Sphinx. Amer. Jour. Sc., July, 1839, 8vo, pp. 40.

‡An Introduction to the Modern Classification of Insects. 1840, Vol II, p. 869.

§Abhandlungen der Koniglichen Academie der Wissenschaften zu Berlin, (1848), 1850.

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placing it between the Noctuidæ and Phalænidæ. He is aided by a fortunate discovery in arriving at the proper location of Castnia. Among some plants received from Kingston, Jamaica, was a species of Catasetum, from the bulbs of which hatched the perfect Castnia, proving that the habits of the larva is lignivorus like the Sesiæ, Ægeriadæ and Cossus and Hepialus. In nearly his own words, the burrowing habits of Castnia, the larva of which forms no silken cocoon, are like Sesia, but the imago differs, and as Dalman observes is nearer Zygæna, whence he concludes that "they seem much more like the beginning of the Spinners (Bombycidæ) and through Glaucopis and a succession of other genera form the passage to Ochsenheimers Euprepia, the genera Arctia, Chelonia, Callimorpha, etc."*

This is indeed bringing order out of confusion. He then proceeds to remark that Castnia and its Australian representative Synemon, which probably has similar habits, belongs to a group of borers, at the head of which stands the "Sesien," (Ægeriadæ) then Thyris, Chimera, Stygia, Eudagria, and farther on Cossus, Zeuzera, Hepialus and Crino, to end with Castnia. He speaks, from want of material, with some doubt of the affinities of *Oiketicus* to this group of borers, but considers that this genus may easily lead to Zygæna.

Dr. Herrich-Schæffer† proposes a different arrangement of the family under consideration; while placing the *Castniaria* H-S next to the butterflies, he follows with the *Epialoidea* H-S. (Hepiali Linn.), next with the Sesioidæ H-S (Ægeriadæ); then come the *Pyromorphina* H-S a group made for *Pyromorpha dimidiata* H-S and another genus *Chrysopygus* H-S. which leads to *Zygænoidæ* H-S. He then strangly interposes the Sphingidæ, Bombycidæ, Phalænidæ (Geometridæ) and Noctuidæ between the groups of Zygænidæ above named, and the rest (Agarista and allies, Syntomis and Ægocera) of the family. Under the names of *Aganaida* and *Agaristoidea*, which groups he makes the equivalent of the *Arctioidea*, and the other groups of moths enumerated above, he places the genera Aganais, Agarista and Ægocera Latreille. He interposes between these two groups, a sub-family of the

*Loc. cit. p. 255.

†Sammlung neuer oder wenig bekannter aussereuropaisher Schmetterlinge. Regensburg, 1850-58,

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Bombycidæ, i. e. the Arctioidea H-S (Arctiidæ Leach, 1815,) and concludes the large moths with the *Syntomoidea* H-S. (Glaucopites Newman, 1832.) Then follow the Microlepidoptera. The series of large moths ends with *Ctenucha virgo* H-S. which he places next to the *Crambina* H-S.

In the Catalogue of Lepidoptera Heterocera in the British Museum, part I and II, 1854, Walker adopts the Castnians, and the Zygænides, as groups equivalent to the Sphingidæ and the Bombycidæ, but places several undoubted Zygænid genera, i. e., *Ctenucha*, *Aglaope Americana* Boisd. and *Lycomorpha* among the Lithosiidæ.

So far as I am aware Horsfield and Moore* are the first authors who virtually placed both the Castniares and Zygænidæ among the Bombycidæ, considering them "from the examination of the metamorphosis" of the genera of these two groups which fell under their observations, as belonging to the Lithosiidæ. This work is indispensable to the American student of the Zygænidæ and Bombycidæ, since it represents the transformation of many Asiatic genera closely allied to those of America, which are not found in Europe.

I would here draw the attention of entomologists to important characters for classifying the Lepidoptera which have been hitherto overlooked. I refer to the characters drawn from the pieces of which the head and thorax is composed. Each family has a distinct form and size, and a different way of combining the three principal pieces which compose the head: i. e. the *occiput* which lies behind the ocelli; the *epicranium* which lies behind the antennæ, and the *clypeus* which in the Lepidoptera generally occupies the "front" of the head. In the family under consideration and the Bombycidæ, those parts vary markedly in the different genera, and in each sub-family of these two families there is a distinct form for the clypeus, more especially. There are also two forms in the *Noctuidæ* which affords to us strong indications for their division into but two sub-families. There is also a distinct form for the Geometridæ, the Pyralidæ, Tortricidæ, and Tineidæ, which gives a peculiar *facies* to each of these groups.

The mouth parts: i. e., the mandibles, maxillæ and labium

*A Catalogue of the Lepidopterous Insects in the Museum of Natural History at the East-India House, Vol. II, 1858-59.

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have not given valid generic characters, with the exception of the labial palpi, the value of which are well known.

In the thorax also there is a family form, at least, in the Zygænidæ and the succeeding group, the Bombycidæ. The comparative length and breadth especially of the meso-scutum and scutellum are of value, as are in a less degree the relative size and position, slanting or vertical, of the flanks of the thorax. But this last character owing to the remarkable constancy in the form of the thorax and abdomen of all Lepidoptera, is not often of generic value*.

I have also found the genital armor most useful in separating genera of moths, but for this purpose alcoholic specimens are necessary so that these parts may be drawn out and dissected. There is however no one general family type to which their great variations of form can be reduced.

These characters are of special use in locating mimetic forms. The Zygænidæ do not imitate the lower moths, nearly so much as do the Bombycidæ. Indeed just as embryologists arrange groups in series by their greater or less resemblance to low embryonic forms, can we arrange animals by the greater or less proportion of mimetic forms in any group.

Mr. Bates (Linnæan Trans. 1862) has considered that the Heliconidæ stand at the head of the Lepidoptera. We venture to question this position of the family from the fact that this family mimics most wonderfully the Zygænidæ. An instance may be quoted from Stoll of a genus allied to Glaucopis which he calls *Papilio Zubina* (Pl. XI. fig. 3.) Judging from the plate simply, the antennæ, the neuration and the brown and yellow bands and white spots are unmistakedly Zygænid; the general form of the body and of the wings are like Heliconia. Among the Pieridæ, Colias has a mimetic form in the Australian *Heterusia pulchella* Koller figured by Herrich-Schæffer. But we cannot think of any other butterfly, or of any Hesperians, Sphingidæ or Ægeriadæ which imitate the lower moths, and therefore we consider this as an argument for the superiority of their rank. On the

* We might here say, that before we were aware of the use Dr. Leconte had made of the epimeral and episternal pieces in the Coleoptera we had used these parts to good purpose in the hymenoptera, where they are exposed to constant variation in genera and groups of genera, as well as families.

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other hand it may be argued that the Zygænidæ are lower than these families, because there are forms among them (Castnia) which imitate the butterflies, others (Alypia) which resemble the (Hesperiadæ) and others again (Glaucopis and allies) which resemble the Ægeriadæ. Thus the lowest genera imitate the lowest family enumerated, while the highest genus Castnia mimics the butterflies. As happily expressed by Professor Dana,* it is "a characteristic of a type of the very highest grade, that it is extensively copied after."

To distinguish Castnia therefore from the Hesperians we look for the square clypeus, and the neuration peculiar to the Castniares. In the lower genera allied to Glaucopis we look at the square clypeus, which is often scutellate, and also at the long slender acute porrected palpi, the pectinated antennæ, and also the peculiar neuration which it is difficult briefly to describe. In certain genera of Bombycidæ, allied to *Limacodes*, which are difficult to distinguish from some Tortricidæ, the practiced eye can by the large broad clypeus which carries the insertion of the antennæ very high up the front, at once locate the genus. Likewise the large broad clypeus enables us to separate those Notodontians from the Noctuidæ, which they resemble. If we could select with safety any single character among the moths upon which to rely, it would be the clypeus.

The Zyæginidæ are distinguished from the neighboring families of Lepidoptera by the following characters: the head is of moderate size and entirely free from the thorax, but not so much so as in the Ægeriadæ or Noctuidæ. There is a great equality in the size of the three tergal pieces of the head: i. e. the occiput, epicranium and clypeus. The length of the two first of these pieces taken together is about equal to that of the clypeus, but more generally shorter, and as among all Lepidoptera the epicranium is the larger and longer. On the flanks of the head, is situated an ocellus just in the rear of the insertion of the antennæ, which are inserted on the side of the head, in front of the epicranium which narrows, and is often bilobed between their bases. In the typical genera the antennæ are simple, not setose, and slightly swelled in their middle, or partially clavate towards the tips as in Zygæna. Eyes large and globose. The clypeus is nearly square, the sides hardly con-

* Classification of Animals based on the principal of cephalization. Amer. Journ. Sc. Jan. 1864, p. 16.

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verging towards the front edge which is very straight, with the edge slightly revolute. Its surface is convex, often remarkably so, sometimes ending in a large mesial tubercle. The mouth parts do not afford good family characters in distinction from the Sesiidæ and the higherBombycidæ—the mandibles are slender, curved, with dense setæ applied upon the well developed maxillæ. Labium small equilaterally triangular. However there is a distinct form of the maxillary palpi, which are long, slender, acute, slightly ascending, but porrect; the third joint is long, acute, thinly scaled, and very free from the head; the first and second joints very equal in length, and with long thin scales beneath.

Thorax moderately stout, longer than broad. The pro-thorax is well developed, especially the scutum (collar), the two halves of which are partly separate, large suborbicular, and often gaily colored. The meso-scutum is small, quadrangular, shorter than broad, the sides bent down angularly under the patagia, which are half as long as the meso-thorax in Zygæna, but more generally much longer. Scutellum nearly as long as broad, lozenge-shaped,the posterior half longer, being more produced than the anterior half. The meta-thorax much as usual, though the scutellum is a little longer and more elevated than in the other families. The flanks cannot be properly described without alcoholic specimens, however, they are slightly inclined—the middle flanks occupy more than half the lateral surface of the whole side of the thorax, while the hind flanks are one fourth to one half as broad as the middle ones. Wings long and narrow, though often triangular, with very short nervules one third as long as the wing. The primaries equal the body in length; they are nearly three times longer than broad, while the costal and inner edge are more parallel than in the other moths, except the Ægeriadæ. Costa straight, apex much rounded; outer edge full, half or two-thirds as long as the inner, internal angle well rounded. The costal space is narrow. The nervules more generally arise far beyond the middle of the wing, and are of very equal lengths, thus making their interspaces very equal. The s.c. nervules are unusually short, especially the fourth, while the fifth equals in length the median nervules. Both the subcostal and median nervules curve inwards and throw off the discal nervules at opposite points, which are together curved very regularly inwards, thus making the discal space which is nar-

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row, less triangular than usual, and less angular at its centre and broader end. The fourth median arises much farther out beyond the middle of the wing than usual, and hence much nearer the three first, the three interspaces being of nearly the same size.

Secondaries nearly twice as long as broad, though more generally one half longer than broad, reaching half way to, or more rarely beyond the tips of the abdomen. Costa straight, but a little convex in the middle. Apex acute and much produced, or obtuse. The outer edge is nearly as long as the costa, the internal angle much rounded, and the internal edge is one half to a third shorter than the outer edge. The neuration differs greatly as in the primaries. In the typical Zygænidæ the subcostal goes straight to the apex, and the single fifth nervule arises by an angle connecting with the discal nervules, being equal in length to the four median nervules which are remarkably short, arising at the outer third of the wing. In Ctenucha and also in Alypia the subcostal sends off a branch as usual, which is not angulated near its origin, while the median nervure has only three branches, which arise near the middle of the wing.

The legs are rather stout, but well proportioned, the joints, in the typical species of very uniform size throughout, and thinly scaled, while in the Castniares they are stouter, more sphingiform with long sharp spines, and hairy femora, while the anterior tibiæ are densely pilose.

Abdomen short, being generally twice the length of the thorax, and thick, obtusely pointed at the tip, sometimes partly truncate. The scales in this family are fine, powdery and scattered thinly over the surface, often leaving naked spots on the wings. Upon the thorax and head the squamation is so fine and thin that the different parts beneath can be often easily distinguished. In the Castniares the scales become larger, more hair-like, approaching somewhat the Sphingidæ.

Often when in doubt about the position of some genera of this family, the peculiar dark coloration of this group aids to settle the question. The general color of the Sphingidæ is cinereous, that of the Bombycidæ is brown, the Ægeriadæ and Zygænidæ differ wholly in being bluish, with purplish shades of black or entirely black alternating with gay colors, golden, bronzed, or white and red. However the typical genera are ornamented

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with green and bright red patches (Zygæna), or are wholly green (Ino), or as in Procris, Ctenucha and allies, deep Prussian blue, or with shades of dark brown with red about the head or pro-thorax. An exception to this general rule is Eudryas with its remarkable arrangement of colors.

Of the two subfamilies into which this family is divided, the Castniares approach nearest the Sphinges, while the lower subfamily, the Zygæninæ, have the closest affinities with the Ægeriadæ. They both in the structure of the head resemble much the Ægeriadæ, since in them the clypeus is square, being broader in front than in the Zygænidæ. But in the last named group the epicranium is shorter, so that the antennæ arise nearer the base of the head; also in the Ægeriadæ, the occiput is nearly obsolete; and they are remarkable from the fact that the head is greatly advanced in front of the insertion of the primaries. This is owing to the great length of the thorax, which agrees with the slender abdomen, and long and narrow wings. Owing to the last character the style of neuration differs from the Zygænidæ in the branches of the nervures proceeding straight out to the outer edge, and being parallel with the costa and inner edge, which last is greatly elongated, and parallel to the costa. Thus while the nervules in both families are very short, one third as long as the whole wing, all arising very near the outer edge; in the typical Zygænidæ they are curved more downwards, and are even shorter. In all the wing characters there is a much greater variation than in the Sesiadæ, and we have broad wings, becoming almost geometriform, being equilaterally triangular, as in Euremia from India and China, with long nervules, arising *within* the middle of the wings.

Another character of importance is the form of the mesoscutellum which differs from the Sphingidæ and Ægeriadæ in being much longer, especially produced behind, where it is much rounded. In Sphingidæ it is subacute. In the typical Bombycidæ (Attaci) it is perfectly square behind. The tergum of the meso-thorax affords better family characters than the other parts of the thorax.

Among the typical genera (Zygæna, &c.) the abdomen is shorter than in the families mentioned above, though this is a character of little value.

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LARVA. It is difficult to give even in general terms the family characteristics of the larvæ of the Lepidoptera, since there are so many exceptional forms. In characterizing those of the Zygænidæ we select that of the European Zygæna, and say from the figures and descriptions of authors that they are short and thick fleshy cylindrical larvæ, whose bodies taper rapidly towards either end. The head is very small and partially retractile within the anterior part of the pro-thoracic ring. The tip of the abdomen is likewise very small and more acute than in the typical form of other families. The feet are sixteen in number. The rings are convex, short, and with transverse rows of unequal tubercles which give rise to thin fascicles of very short evenly cut hairs, which are seldom dense enough to obscure in the least degree the outlines of the body, and are often nearly absent. Often there are one or two transverse bands of gay colors or of dark spots between the rows of tubercles and the edges of each ring. The colors are greenish or yellowish. This form is more especially that of the subfamily Zygæninæ.

When we depart from this typical form and ascend to the neighborhood of Alypia and allies we find them elongated, with large heads, and with a supra-anal tubercle towards which the body imperceptibly increases in size: the colors are gay, and the long unequal sparse hairs arise from minute tubercles. This form is evidently influenced by the close approximation of the genera to the Sphinges. This is the prevalent form of the Castniares. On the other hand in descending towards the Bombycidæ, we find the larvæ again elongating, but not by any means so much so as in the Castniares, while the head still increases in size, and the body is rather thickly clothed with hair, with mesial tufts of larger and party-colored hairs.

The larva of Ctenucha resembles the Arctians very remarkably. Stoll* figures the larva of a genus which resembles closely the larva of *Halesidota*, which is still longer than Arctia, being related to Orgyia. It is elongated, very hairy, with long pencils of party-colored hairs before and behind. The pupa is like that of Arctia, while the moth belongs to the old genus Glaucopis, having feathered antennæ and a Sesia-like body.

When the larva is about to pupate, it constructs a dense silken cocoon generally, but Eudryas and Castnia make no

*Supplement a l'Ouvrage, intitule Les Papillons exotiques. Par M. Pierre Cramer. Pl. XI. fig. 1,a, b, c, d.

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cocoon, and as we show below that of Ctenucha is formed simply of hairs. There is but one brood in the year, since the larvæ hybernate, and at the beginning of summer pupate, to become moths in the middle of the season.

PUPA. The pupa of Zygæna is represented as of a form intermediate between Ægeria and Arctia, being much stouter than the first and somewhat more so than the last. The head is prominent and the tips of the abdomen subacute. Ctenucha is more arctian, while Castnia and Alypia are elongate slender, with the head made especially prominent by the tuberculous clypeus.

In common with the Sphingidæ and Ægeriadæ, the Zygænidæ are confined to the temperate and tropical regions. The family type *Zygæna* has its metropolis about the Mediterranean Sea, and thence spreads to the north of Europe, and southward to the Cape of Good Hope. *Z. exulans* is found as far north as Lapland, and in vertical distribution rises 6000 to 7000 feet in the Alps of Styria.

The types of the Castniares however are tropical American. Alypia is the most northern genus, extending into the Hudson Bay Territories. Glaucopis and allies which form an immense number of species are almost exclusively tropical American. In Australia as Klug observes, Castnia is represented by Synemon. The American genus Eudryas is represented by very closely allied South African genera.

From the study of the illustrations of Hübner, Moore and Herrich-Schæffer we are convinced that there are forms which lead from Castnia to Zygæna so gradually as to unite the old families of Castniares and Zygænidæ into a single group equivalent in value to the Sphingidæ, Noctuidæ or Phalænidæ of Latreille's families of moths, first proposed in 1807 in the "Genera Crust. et Insectorum." The genera Eusemia, Neochera, Anagnia, Milionia, Eterusia, Pintia and Agalope show this transition. They have the simple antennæ, in most cases; the broad secondaries, the long nervules, stout hairy palpi and bands and spots of the Castniares, with more superficial but striking resemblances to the Glaucopides among the Zygænidæ.

It follows, therefore, that the two subdivisions of the groups are *subfamilies*, each of which I would consider as the equivalent of the Lithosiidæ, the Atticidæ or any other one of the subdivisions of the family Bombycidæ.

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In retaining Latreille's term "family" for these large groups of moths, I am aware that I go contrary to the practice of modern lepidopterists who give names to very small groups of genera after raising them to the rank of "families."

Subfamily CASTNIARES Boisduval.*

The family name given by Boisduval to this group is adopted instead of Latreille's term Hesperi-Sphinges.

This group is a difficult one to characterize, owing to the great diversity among the genera, so few of which we have been able to examine. As it is, this description must be considered as but provisional.

The most trenchant characters are, the large head, the prominent front, the long simple filiform, subclavate or subprismatic antennæ, the stout bushy palpi, with the terminal joint very slender and projecting much beyond the head. The convex clypeus is square, but often narrows in front, and is provided with a mesial tubercle projecting beyond the hairs. The body is stout and the thorax often pilose. The meso-scutum is longer than in the *Zygæninæ*, approaching more in this respect the Hesperiadæ. The fore-wings are stout, broad triangular, with long nervules. Secondaries broad, with very obtusely rounded apices, while the internal angle reaches nearly to the tip of the abdomen, which is moderately long and terminates in a slender subacute tip. The legs are stout, often very hairy and somewhat tufted.

The larval characters given below are drawn from the caterpillars of Alypia and Eudryas preserved in alcohol, and from figures of those of *Psycomorpha epimenis* Harr. drawn by Abbot and now in the library of the Boston Society of Natural History; of the Australian *Agarista glycinæ* Boisd. (*Phalænoides glycinæ* Lewin); and of the East Indian genera *Eusemia* Dalman, *Hypsa* Hübner, *Anagnia* Walker, *Atteva* Walker, *Lyclene* Moore and *Bizone* Walker, which are figured in Horsfield and Moore's "Catalogue."

The body is elongated, cylindrical, the eighth ring is either considerably enlarged, towards which the body increases in size, or it is simply humped on the upper surface of the ring. From this ring the end of the body rapidly diminishes in size, laterally and

*Monogr. Zygænides, 1829.

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especially from above where it slopes down suddenly to the supra-anal plate which is short, broad and lunate.

There are six rows of small tubercles, or spots representing tubercles, which are largest above, and decrease in size on the sides of the body. On each ring the four tergal rows arrange their tubercles in a trapezoid. There are three rows on each side, and another row at the base of the legs. These give rise to single hairs, or slender spine-like hairs. The rings themselves are not very convex, and between the hairs and edge of the ring are crossed by bright or dark colored narrow lines or rows of spots which gives the larvæ a gay appearance.

The head is rather large and free from the pro-thorax. It is broad above, as well as below, and three-fourths as wide as the body. The clypeus is larger and its anterior division long, being equal in breadth to the length of the posterior division: its edge is not thickened, but when seen from beneath is slightly arched upwards.

The labrum is not very deeply bilobate. Each lobe may be divided into an outer corneous portion and an inner softer fleshy part. The labium and maxillæ are large and broad.

Castnia Fabricius.

In examining *Castnia*, a moth which is so completely Hesperian in its analogies, we are not at all baffled in ascertaining its family characters. Though with the broad head, long thorax and peculiar shape of the wings which belongs to the Hesperians, and the form of the abdomen of that group it still differs essentially even in these parts.

The head is one half narrower, the clypeus is still square, and the antennæ are inserted much higher up the front than in Hesperia. The epicranium (vertex) is one-half shorter than in Hesperia. The antennæ do not differ greatly from Zygæna, and often resemble that genus much more than the antennæ of the Sphingidæ. The palpi are more like the higher butterflies; in Alypia they are more like those of Hesperia.

The meso-thorax, as well as the pro-thorax, is greatly elongated. The meso-scutellum is very long and rounded behind instead of being short and acute posteriorly as in the Bombycidæ; in this respect closely resembling the Hesperians and butterflies generally.

In the triangular primaries, with their regularly curved costa,

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the produced and acute apex, and the very straight outer edge and rectangular internal angle; and in the peculiar form of the secondaries, the analogies to the Hesperians are remarkably close. This is shown especially in the fact that the internal edge of the secondaries is longer than the outer edge, much of which goes to make up the broadly rounded apex. They also reach out even with the tip of the abdomen; in Coronis, Cocytia and Alypia they are considerably shorter.

But in considering the neuration, we find it pursuing a plan very diverse from all the butterflies, which at a glance reveals the affinity of Castnia to the other Zygænidæ. The subcostal nervule in the butterflies throws off its five very short nervules upon the costa. In Castnia all the nervules are remarkably long, and are directed in just the reverse direction from the Hesperians, i. e., downwards and outwards upon the outer edge.

The four median nervules are remarkably long and continuous with the nervure. In Hesperia and other butterflies the first median often becomes the "independent" of authors, and the three below are grouped together separately. Castnia and the allied genera have an additional nervure, the submedian, which is generally in the Lepidoptera obsolescent. In the secondaries the subcostal is like that in Hesperia, but there are four median nervules, while in Hesperia there are three only, and they are much longer, arising very near the base of the wing.

The coloration and squamation which are so near the Hesperians have always been remarked by authors.

ALYPIA Hübner.

Head small; front long, pilose, the scales surrounding the conical projection of the clypeus, but not concealing its apex. Antennæ long, a little thickened in the middle, with scattered lateral setæ. Clypeus square, the front margin very obtusely rotund-pointed. First and second joint of the palpi stout, pilose; third joint long slender; the whole palpus porrect, the third joint passing beyond the front of the head.

Thorax more then usually pilose, especially the pro-thorax and patagia. Wings short and broad. The primaries are one-half as broad as they are long, being broadly triangular. The nervules are rather short, and arise at a greater angle with the main nervures than in *Eudryas*. Secondaries rounded, trian-

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gular, the outer margin full, rounded at the apex and also at the internal angle.

The legs have the first pair of femora and tibiæ densely spreading pilose and stretched out in front of the body as in some Notodontians. The hind pair of legs are large and long, with stout tibiæ armed with two unequal pairs of spines, of which the terminal pair is the shorter.

In coloration the species are black moths with large white and yellow rounded patches upon both pairs of wings, and with deep vermillion upon the pro-thorax.

PUPA. The specimen described is from the cast skin, consequently broken, from Dr. Harris' Cabinet, kindly loaned me by Mr. Scudder. Compared with that of Eudryas the body is not at all contracted at the base of the abdomen, there being a continuous curve from the pro-thorax to the tips of the abdomen, while that of *Eudryas* is very sensibly contracted at this point. The head is too much injured to describe. The pro-thorax differs in being square behind, where in Eudryas it is a little pointed. The meso-scutellum is not at all defined in outline, nor is the whole meso-notum so much produced behind, being more bluntly rounded, thus making the meta-thorax longer. The wings are in form, relative size and position as related to the abdominal rings, much as in Eudryas. The basal abdominal rings are beneath, broader than in Eudryas, and the spiracles are much more distinct.

The abdomen tapers much the same in both genera, the chief difference lying in the tenth ring and the genital parts. This ring is much smaller and one-half shorter. Seen from above the ring is larger; the upper pair of tubercles are broad and squarely docked, and the tergum is lengthened out even with them, while the surface has longitudinal rugæ. The lateral tubercles are obsolete. Beneath is a distinct curved line, which is the trace of the claws of the anal legs of the larva. This mark is obsolescent in Eudryas. The larva previous to pupating constructs an earthen cocoon, like that of *Ægeria*, according to Harris

EUDRYAS Boisduval.

Head rather large, eyes and ocelli large and full. Antennæ not thickened in the middle, with short lateral setæ in the male and pubescent beneath. Front prominent, densely pilose, though the hairs hardly conceal the conical clypeal tubercle, which

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last is very large and truncated at the apex. The clypeus in front is square. Palpi large, porrect; two basal joints evenly pilose to the tip of the second. Third joint small, cylindrical, short, porrect reaching nearly one-half its length beyond the front.

Thorax pilose, with a broad median crest of metallic-colored scales, succeeded by a dorsal row of similar tufts upon the basal half of the abdomen which diminish in size from the thorax.

Wings shaped as in *Alypia*, but the primaries are more rounded at the apex, internal angle rounder. The nervules are nearly continuous with the direction of the main branches. Subcostal nervules long, first subcostal arising one-third of the distance out to the apex of the wing. The hind wings hardly reach to the outer fourth of the abdomen, being much as in *Alypia*. Outer margin a little scalloped below the apex, below straight and parallel with the costa of the primaries. Discoidal nervules situated within the middle of the wing. The femora and tibiæ of the fore-legs are very pilose, forming a dense tuft projecting in a mass over the first tarsal joint. Hind pair of legs stout, with longer tibial spines than in *Alypia*.

The very intimate relationship of this genus to Alypia may be better seen after a more detailed comparison.

The head of the genus under consideration is much larger, the eyes are nearly twice larger, more globular, and occupy a larger extent of the sides of the head. The whole front of Alypia is proportionally narrower than that of Eudryas, the ocelli and antennæ are therefore more approximate in the former genus. The occiput is much developed in Alypia, occupying a much larger area than in Eudryas, where it forms but a narrow rim. The convex epicranium is larger in Eudryas, being twice as broad as long, and having a slight ridge between the ocelli. In Alypia it is nearly two-thirds as long as broad, convex, and narrow in comparison with Eudryas. The clypeus in Alypia is very distinctly rectangular, the sides being exactly parallel, and the angles well pronounced, while the same piece in Eudryas narrows rapidly anteriorly, is longer than broad and has the angles of the anterior edge a little rounded. Both genera possess a large truncated conical tubercle rising from the surface of the clypeus a little in advance of the middle, but it is smaller and slenderer in Alypia.

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The mandibles of Alypia are equilaterally triangular, as is also the labrum. In Eudryas these parts, at least in the specimens at hand, are much less developed. Beneath, the head of Eudryas is narrower between the eyes, and the labium is larger and longer than that in Alypia. The antennæ of Alypia are most Zygænid in character, being swollen a little beyond their middle: those of Eudryas are Noctuid, being filiform, tapering gradually toward the tip, and setose. The palpi of the two genera do not differ essentially, though in Eudryas they are stoutest, most thickly scaled, and the most depressed, being porrect, while the third joint does not go so far beyond the front as in Alypia. They also agree in the structure of the legs: in both the fore tibiæ are thickly tufted, but especially so in Eudryas, wherein this genus resembles closely some Notodontians. In both genera also, the hind tibiæ are large and thick with four nearly equal spurs, but longer and more slender in Eudryas.

The wings agree very nearly in outline. In Eudryas the costa of the primaries is straighter, the apex more rectangular and also the outer edge is straighter than in the other genus. The neuration is very similar in both genera, but Eudryas has its nervules longer, arising at about the middle of the wing, while in Alypia their origin is carried farther out beyond the middle; thus the first, second and third subcostals are farther apart at their origins, longer and more parallel to the costa, since by their decrease in length in Alypia, they go to the costa and apex more rapidly and at a greater angle. In Eudryas the third subcostal subdivides at the inner third of its length, but in Alypia nearer its middle. The intercostal space has the inner side shorter than the outer in Eudryas, while in Alypia it is longer than the outer side. The fifth subcostal remains in the former genus attached to its nervure, while in Alypia it is detached, being removed towards the middle of the median area. The nervules of the median are more approximate at their origins in Eudryas. The first and second median are nearest together at their origin in the last named genus; the second and third are nearest together in Alypia, where also the median area of the wing is shorter and broader than in Eudryas, which has a longitudinal crease reaching from the base of the wing to the point of juncture of the two discal nervules.

The secondaries also agree remarkably well in their form and neuration. The nervules are still very long. But the first median in Eudryas is continuous with its nervure, and its origin

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is identical with that of the lower discal nervule, while the course of the nervule in Alypia is much more flexuous.

The abdomen in Alypia preserves the peculiar family form; in Eudryas however it is slenderer and gradually tapers towards the pencilled tip.

The Bombycid characters of Eudryas are found in the peculiar squamation: i. e., in the thickly scaled thorax, the middle of which is covered with the steel colored large and broad scales which occur in the same place in Tolype, and it resembles Heterocampa and Datana, near which the genus was placed by Dr. Harris, who has given quite full details about the habits in his descriptions of the two species *E. grata* and *E. unio*.

Mr. F. W. Putnam has observed the larvæ of *E. grata* feeding on the grape vine in Bridport, Vt., and collected the larvæ and pupæ in alcohol, which are in the Museum of Comparative Zoölogy at Cambridge. The moth of *E. unio* has been collected by a friend in Bangor, Maine.

Dr. Fitch has raised the larvæ of both species from the grape. He says of E. unio* that it "is equally common with the preceeding, and the worms are so much alike that we as yet know not whether there are any marks whereby they can be distinguished from each other." p. 399.

LARVA. The head is of good size, being three-fourths as wide as the body. It is nearly as broad across the vertex, as in front, above it is rather deeply impressed by the median line. The V-shaped epicranium is large not sunken below the level of the front; its apex is rather blunt, its sides bulge out from the apex to the anterior third of its length, where it is slightly contracted; and when it joins the clypeus its edge is linear. The short transverse clypeus is as broad as the epicranium is long, its front edge being straight and very slightly raised.

The labrum is divided half of its length by a sinus, into two lobes which are farther sub divided into two portions, the outer corneous and hard, and shaped somewhat like the mandible of the mature moths of this family, while the inner portions meet on the median line, and are more fleshy.

The two jointed antennæ are placed directly opposite the thick sub triangular truncated mandibles.

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*Third Report Insects N. Y. 1856.

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The labium and basal portion of the maxillæ are broad and thick.

The body is elongated and gradually increases in width to the eighth ring, which is much enlarged and raised into a hump, from which the body rapidly narrows, and the tergum falls down at an angle of about 45° to the broad lunate supra-anal plate.

The rings are slightly convex; across their middle is a row of tubercles ending in hairs equal in length to that of the ring itself. Upon the tergum of each ring are four large tubercles arranged in a broad trapezoid, two in front and two more distant, on the middle of the ring; on the thoracic rings these tubercles are arranged in a single transverse line and on the supra-anal plate in a square. Below is a lateral row of similar warts, one for each ring, immediately below which is the row of stigmata, behind which, on each ring, is a minute wart. On the pleural line of the body, formed by the triangular raised portion of the side of each ring is a tubercle; and at the base of all the legs is a single similar wart. On the sternal side of the body on the segments between the legs, is a transverse row of smaller warts than those above, which are inclined to be geminate between the true and false legs. There is a distinct thickening of the skin on the sides of the anal legs, as in the Bombyces.

The coloration of the body generally, is a light hue, with linear transverse tergal stripes, about six for each ring, and nearly black in color, which are interrupted near or between the tubercles.

On the vertex of the head are four black spots; below in a curvilinear line are three black spots on each side of the epicranium, and two on the front edge of the clypeus. Around the V-shaped apex of the epicranium are smaller dots. There is a single dot within and opposite the eyes which are arranged in a line forming a little more than a semicircle. All these spots give rise to minute hairs.

In another lot (which may possibly be the young of *E. unio*) are some smaller than the specimens noticed above. The head is much the same, but the clypeus is smaller, and its sides do not bulge out. The spots on the head are the same, but the eyes are not surrounded with black. The eighth ring is more distinctly humped. The whole body is smoother, since the tubercles in Eudryas grata are here merely black spots, and much smaller, so that the transverse tergal lines are much more

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prominent. There are no hairs on the body, while in Eudryas grata they are prominent.

PUPA. Dr. Harris (p. 427) merely remarks that "the chrysalis is dark brown, and rough with elevated spots." The whole body is elongate and rather slender; both the head and pro-thorax taper continuously towards the clypeal tubercle, which is quite prominent. The antennæ do not reach to the end of the wings. The pro-thorax is twice as broad as long; slightly carinated. The sides of the body are continuous and straight from the base of the wings to the fourth abdominal ring, while the body itself is hardly depressed or constricted at the juncture of the thorax and abdomen. The wings meet upon the sternum, reaching to the middle of the body. Fifth to seventh rings of the abdomen separated by deep sutures, while the surface of each ring is flat, not convex, with two rows of small teeth; while lower down on the sides of the body are four tubercles, being the remnants of the two middle pairs of prop legs. The remaining rings are less angulated. The tips of the abdomen is obtusely conical, ending in four tubercles, the pair above long and truncate, those below broad and short. On the under side are two minute approximate tubercles.

The whole chrysalis is of a dark mahogany brown, with the surface finely granulated.

Length, .80; breadth, .20 inch.

Subfamily ZYGÆNINÆ.

We use for the subfamily name one previously employed by Swainson in 1839 for a family of Sharks. He was evidently mistaken in saying that Cuvier was the first to adopt the name Zygæna. That name was long before proposed by Fabricius in 1775, and adopted by Latreille in 1807.

The head is large and prominent; the front very convex, nearly square, with the angles well defined, with rather long or short scales. The occiput and epicranium together equal in length the clypeus which is square, convex. The antennæ are inserted therefore midway between the front edge and the base of the head. They are in the typical genus simple, much thickened towards the extremity or, as in the lower genera, well pectinated. The two ocelli are situated at either end of the raised suture or ridge between the occiput and epicranium, and immediately behind the insertion of the antennæ. The eyes are large, globose. Labrum short and broadly triangular.

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Mandibles long and narrow, the tips incurved, the dense setæ on the inner side converge over the base of the maxillæ, which last are well developed, reaching when unrolled, nearly to the posterior trochanter. The three-jointed labial palpi are large and long, ascending, and often reaching beyond the front by the length of the third joint. The joints are nearly equal in length, from the two basal joints depend long scales; those on the third are short and generally fine.

Thorax but moderately stout, being a little wider than the abdomen. The two prothoracic scales (scutum) large, orbicular and very distinct. Patagia often large and long. Meso-scutum shorter than broad. The large scutellum encroaches upon it, being one-half and sometimes two-thirds as large as the scutum. It is a little longer than broad, very equally produced before and behind, being longitudinally somewhat lozenge shaped.

Meta-thorax short, scutellum transversly linear, while the scutal pieces are small and narrow, being crowded away on the sides of the thorax.

Wings long and narrow, and the nervules arise beyond the middle of the wing in nearly every genus, being much shorter than usual, and having their origins very approximate and equidistant. Primaries nearly three times as long as broad. Costal edge convex near the base and towards the obtusely rounded apex. The outer margin is on the average one-fourth shorter than the internal margin with which it is nearly continuous, the internal angle being obscure.

Marginal and subcostal nervures at nearly equal distances from each other, subcostal nervules short, their origins approximate, and *all* arise *beyond* the middle of the wing. Third generally forked. Fourth either independent, being removed towards the middle of the discal space, or simply branching out from its nervure as usual.

The four median nervules are very short, nearly equal in length; their origins nearly equidistant, all four being grouped closely together, since the fourth is remarkably short. Submedian often present, or its place when absent indicated by a well marked fold. Internal long, terminating near the end of the fourth median.

Secondaries long, narrow, and acute, rarely short and obtuse. Costa long, inner margin one-half as long as the outer. Nervules generally short and very equal in length. Discal space divided by a well marked curve; discal nervules directed

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inwards to meet it. Subcostal and median nervules as described in the primaries. Submedian most often present.

The trochanters are very nearly vertical, or in the slender-bodied genera much inclined, and are then long and slender. Legs long and slender, all the joints slender, and of very uniform thickness; the tibial spurs are small, the tarsal joints long, very slowly diminishing in size.

The abdomen is hardly twice as long as the head and thorax together, generally stout and obtusely pointed at the tip, which is rarely tufted; sometimes slender. The scales that cover the body are fine and powdery; on the wings they are especially so, and are often absent in the middle, making them transparent. Moths of this family are of brilliant rich and gay colors, being of different hues of green, deep blue, black, black and white; red and brown, yellow and black, and white and red with bright bands and spots. The crust of the body is often shiny black.

The characters of the typical larvæ and pupæ have been considered under those of the family, and farther on in the description of *Ctenucha*.

HARRISINA nov. gen.

Under this name may be placed the *Procris americana* of Dr. Harris, *Aglaope coracina* Clemens and another undescribed form from the middle states communicated by Mr. F. G. Sanborn. Without attempting to improve upon Dr. Clemens' excellent description of this genus*, we would merely point out some marked differences from *Procris* Fabr. and *Aglaope* Latr. From the latter genus Harris states† that the *americana* entirely differs. With Fuessly's figure of Latreille's *infausta* from Southern Europe before us, which has broad wings and bright colors, and differs throughout, we are convinced of Boisduval's mistake in referring our species to it.

However it differs nearly as much from *Procris vitis* and allies of Europe. The wings are a third longer and much narrower, the apex is much more rounded and the outer margin much more oblique. One of the best distinctions lies in the very ovate secondaries of *americana*, owing to the convex outer

* Contributions to American Lepidopterology, VII, p. 589.

† Loc. cit. p. 38.

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edge, which in *Procris* and *Ino* as well as *Zygæna*, is angulated in the middle, thus giving the wing in those genera a squarish appearance. The nervules are longer and more parallel with the costa. When expanded the secondaries only reach to the basal third of the abdomen, while in *Procris* they reach to the basal two-thirds. The abdomen is remarkably square, a little flattened and slightly spreading in the female of *Harrisina*, in Procris it tapers gradually to an obtuse point.

Dr. Harris has given ample details of the history and transformation of the *americana*, and it is most appropriate to dedicate to his memory the genus to which it belongs.

Dr. Fitch also gives the following summary of its aspect and habits. "In August standing in a row side by side on the under surface of the (grape-vine) leaf, eating its edges, and leaving only the coarse veins, little yellow worms about .60 (inch) long and slightly hairy, with a transverse row of black spots on each ring; forming their tough oblong oval cocoons in crevices; the moth appearing the following July." Third Report, 1856, p. 398.

HARRISINA SANBORNI nov. sp. Another interesting species belongs here, kindly loaned me by Mr. Sanborn, to whom it is dedicated. It is half the size of *H. americana*, has shorter wings; primaries with a more convex costa, while the costa in the secondaries is straight. The neuration also differs. The costal nervure goes more rapidly towards the costa, and in fact the whole costal area is broader, the median nervures are more angulated at their origins, and are wider apart, with consequently larger interspaces than in *H. americana*. The abdomen is much shorter. The antennæ likewise differ in having stouter pectinations.

It would at first, from the similarity of its colors, be easily mistaken for a dwarfed *americana*, but it differs throughout. From Dr. Clemens' *A. coracina*, of which unfortunately no measurements are given by that author, it will be known by having a saffron collar which is however smaller than in *americana*.

Our species is wholly deep blue black, the tinge being decidedly bluish and not greenish as in *americana*. Length, female. 20; Exp. wings, female, .61 inch.

We would place after this genus, *Pyromorpha dimidiata* H.-Sch., Exot. Schm. 1855, of which *Malthaca perlucidula*

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Clemens Proc. Phil. Acad. Nat. Sc. Nov. 1860, is evidently a synonym. Of the former genus a figure was simply published, Dr. Clemens has however given a careful description of the genus as named by him.

CTENUCHA Kirby.

In 1839 Dr. Harris* placed *Ctenucha* as a subgenus of Glaucopis immediately after the subgenus Lycomorpha, and including *C. semidiaphana* Harris in it, gives generic characters to suit the admission of this last named species.

In 1854 Walker† divides the genus Ctenucha into four groups of species. Group 1. *Ctenucha* proper, includes *C. latreillana* Kirby. Group 2. *Philoros*, includes three species from Mexico and New Grenada. Group 3. *Scepsis*, includes a single species *S. fulvicollis*, and group 4. *Aglaope* is restricted to *A. americana* Boisd. for which Mr. Walker thus makes a new synonym *Ctenucha americana* Walker. His description of the species is copied *verbatim* from Harris, except that the measurements are omitted, though three specimens are referred to as coming from Georgia, and "presented by E. Doubleday Esq." p. 286.

In 1860 Dr. Clemens‡ excludes *Aglaope americana* Boisd. and divides Ctenucha into four groups, with *C. latreillana* Kirby as the type, discarding Walker's subgenera *Philoros* and *Scepsis*.

We venture to say that of all the species referred to this genus by Walker only *C. virginica* Grote (latreillana Kirby) and *C. cressonana* Grote belong properly to it, and would limit it, for the present, by the characters subjoined. *Ctenucha virgo* H-S. from the "Antilles" belongs to another genus.

Mr. A. R. Grote has shown§ that Ctenucha latreillana Kirby is the Sphinx? virginica Charpentier. Edit. Esper's Exot. Schm. Sphing. Exot 1830 Plate 2, fig. 3 male, 4 female. He says also, "I have taken it in damp woods in the vicinity of Buffalo, N. Y., as well as along the Canadian shore of the Niagara River. It has also been reported to me as having been taken in different parts of the Eastern and Middle States."

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* Cat. N. Amer. Sphinges.

† List of Lep. Brit. Mus. Pt. II. Lepidoptera Heterocera. London, 1854,

‡ Proc. Acad. N. Sc. Phil. Nov. 1860. p. 537.

§ Proceedings Ent. Soc. vol. II Dec. 1863, p. 334.

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In this genus the front of the head is as broad as the distance from the insertion of the antennæ to the front edge of the clypeus, being full and convex. Ocelli large. Eyes full and globose, of the usual size. When denuded the clypeus is seen to be short and scutellate, as long as broad, rising between the antennæ into a low obtuse point. In front it sweeps rapidly away from the eyes, rising from them, while the front edge contracts rapidly, the sides being slightly excavated just behind the square subtruncate front edge, which seen from below is somewhat arched. On the surface is a slight mesial ridge extending and increasing in size to the base of the piece. The two pieces behind, i. e., occiput and epicranium are together in length equal to the clypeus, so that the antennæ are situated very exactly midway from the base to the front of the head. The "vertex" of the head is clothed with much longer scales than the frontal ones which project out between the antennæ. The occiput is regularly transversely oblong, being about four times as wide as long. The epicranium is narrower, subtriangular, truncate in front; and at its base encroaches a little upon the occiput, than which it is one-fourth longer. The triangular labrum is short, broad and obtusely pointed. Mandibles slender, being nearly twice as long as broad, not very acute, with long setæ converging over the maxillæ which are well developed, and when unrolled reach to the base of the abdomen. The palpi are long and slender, of good size, porrect, somewhat flexuous in their course, curving downward at their base, and then rising a little, in front of the head, while their tips are a little depressed. First joint nearly as long as the second, with long depressed scales beneath, but generally the scales are fine. Second joint twice as long as broad, and with the third which is a little shorter and acute, reaches out in front of the clypeus.

Antennæ half as long as the primaries, with long finely scaled pectinations, each of which bears a terminal seta. In the female the pectinations equal in length that of the joints of the antennæ.

Thorax and body generally, stout and finely scaled. Patagia large free from the tergum beneath, reaching behind nearly to the posterior edge of the meso-scutellum, while its posterior scales reach to the base of the abdomen. The prothoracic scales are orbicular, large, and are unitedly considerably broader than the head. Meso-scutum short, broader than long; scutellum

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large and pentangular, the longest side being the posterior edge which is a little convex, and scarcely angulated in the middle. Wings broad; the primaries a little less than half as long as broad. Costa full, convex towards the apex, which is rounded acute. Outer margin half as long as the costa, more than usually oblique. Inner edge two thirds as long as the costa. The costal area is very narrow in this genus, since the subcostal runs very near the edge of the wing, and its first, second and third nervules are very long and parallel to the costal edge. Third subcostal simple, the fourth arises midway between the apex of the wing and the origin of the second subcostal. Fifth slightly removed towards the middle of the discal area, arising directly opposite the first and second median nervules, the origins of which are united, the second being straight, while the first and third are arched, the last named one arising very near the two first. They then enclose a very regular semioval area. Fourth median arises at a distance from the third equal to the length of the two discal nervules, which are straight, and unitedly are directed exactly at right angles to the costa.

The secondaries are broadly triangular, reaching nearly to the tips. The costa is decidedly convex within its middle, the apex is produced, but very much rounded, as in the internal angle, though the inner edge is itself very straight, and is one half as long as the costa. The lower discal nervule is directed obliquely outward, and both are curvilinear. The space between the first and third median is acutely triangular, since the nervules are nearly straight.

The legs are long and slender, the hind tibiæ with two pairs of small acute unequal spurs, of which the inner pair are the smaller. Hind tarsi longer than the hind tibiæ, and the first tarsal joint is a little shorter than the three succeeding ones taken together. Abdomen twice the length of the thorax, provided with minute lateral tufts, slowly tapering towards the tip which is subacute, though not abruptly pointed.

The colors of the genus are deep indigo blue, with a smoky tinge on the primaries, a lighter blue abdomen and saffron "collar." The nervules may be concolorous or as in the very interesting *C. cressonana* from Pike's Peak, described by Mr. Grote—to whose kindness I am indebted for a specimen of this rare species—the median and submedian nervules are white and thus remarkably distinct. The size of the genus is large, both species expanding two inches and a half.

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I find after receiving a specimen of *C. cressonana* from Mr. Grote that there will have to be no modification of the generic characters given above, which were drawn from a single species *C. virginica* Grote. In the first named species the palpi are more curved up in front of the head than in the latter, otherwise the differences are merely those of coloration.

LARVA. The head is large, being nearly as wide as the prothoracic ring. The vertical region is largely developed, and is considerably narrower above than in front. The epicranium is small, being nearly equilaterally triangular, the clypeus is narrower than the epicranium is long, and is raised, thickened, and its front edge distinctly convex. The labrum is short, and divided into two remote broad and short lobes. The mandibles are very broad, short obtuse and thick. The labium and maxillæ can not very well be made out in my specimen, they are fleshy and with no determinate form for comparison.

The body is short and rather thick, the rings moderately convex, and in consistence the skin is softer and more flexible than usual. On each side of the body are six rows of tubercles —the tergal ones much the largest. There are on each ring of the abdomen four tergal warts, arrayed in a broad trapezoid, becoming linear in position on the thoracic rings, and on the supraanal plate. These tubercles give rise to dense fascicles of evenly cut hairs, which radiate out on every side so as nearly to conceal the body, and give it when viewed from above a regular broad elliptical form, with very even sides. The eighth ring is not enlarged, but the body from that ring tapers posteriorly rather rapidly to the tip, though not by any means so much so as in Eudryas. The abdominal legs are short, thick and hairy and the thoracic legs are still more bristly.

The hairs on the upper part of the larvæ are collected into a mesial line of slight tufts. The head seen from above is concealed by dense overarching hairs True and false (abdominal) legs covered by lateral radiating hairs. The outline of the tergum is hardly tufted, but rather scalloped, the scallop on the third and twelfth rings of the body being the most prominent, becoming short thick tufts. The hairs when magnified are seen to have long thickset spinules.

The specific characters are these. The body of the larva is purplish livid covered with white and yellow hairs. Those hairs on the first two thoracic, and last two abdominal rings are all white. The head is a bright shiny red, black in

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front. There is a subdorsal and lateral row of bright yellow elongated spots, one for each ring, which are conspicuous through the hairs. Thoracic legs black, abdominal legs reddish, nearly concolorous with the head.

A few specimens in the fourth (?) stage, i. e.: that next to the last moulting differed thus: They are more oblong in outline. Those hairs which in the fullfed larva were described as black are here white. The mesial line of scallops here become actual tufts and black in color, of which the first and last are the longest. The hairs overarching the head and tip of the abdomen are whitish gray. The colors of the body and the two rows of yellow spots are the same as in the mature larva. The "frass" is short thick cylindrical with no markings.

These larvæ in both the stages of growth above described were found June 6th, 1862, on the spears of grass, which grew in a sunny place upon a high neck of land running out into Casco Bay, Maine. Most of the caterpillars were feeding, a few mature larvæ were running about restlessly. A year after at the same place but a single specimen in the fourth (?) moulting was found May 16th. This one was kept in confinement until July 8th. Towards the last it languished until numerous Braconid larvæ issued in different directions from the body and spun their silken cocoons in a bunch upon the outside of the larva, when it died.

June 18th the Ctenucha larva began to construct its cocoon. Early in the morning it described an ellipse upon the side of the glass vessel of hairs plucked from just behind the head. From this elliptical line as a base, it had by eight o'clock built up rather unequally the walls of its cocoon; in some places a third of the distance up, by simply piling upon each other the spinulated hairs, which adhered firmly together. At four o'clock in the afternoon, the arch was completed, and the larva walled in by a light thin partition. Soon afterwards the thin floor was made. No silk is spun throughout the whole operation. I afterwards carefully examined portions of the cocoon under the microscope, and could detect no threads of any kind.

Four days after, the pupa appeared, and July 15th the moth came out. The female laid smooth green spherical eggs in a patch, side by side upon the side of the vessel, which hatched out July 28th. The young larvæ were about twice the size of those of Orgyia when of the same age. They had large heads, and the body gradually decreased in size towards the opposite

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extremity. The hairs were sparse, long and rather uneven, much resembling young Orgyiæ. Owing to my absence the larvæ could not be raised. It will be seen that the larva lives twelve days in the egg, about ten months as a larva, since there is but a single brood in the year, and they must hybernate when two-thirds grown; it spends about twenty days in the pupa state, and but a few days as a moth.

I have taken the moth late in July at Perry, Me., and early in August at Brunswick. It flies in the hot sun, hovering over flowers, and is not difficult to capture, since its flight is not strong or rapid. In cloudy days it clings to the stems of plants, and can be easily taken with the hand.

A good illustration of the larval characters of the family compared with those of the Bombycidæ, is seen in the growth of the young Ctenucha, which at first has a very large head and long unequal hairs, like the larvæ of Orgyia and in a less degree like the Ceratocampadæ in their first stage. Afterwards in the third and fourth stage of growth they resemble the Bombycidæ in having tufts of longer hairs than those around and differing from them in color. This act of throwing off the characters of a lower family in the course of its growth, is an index of the relative rank of the two groups. The young Ctenucha thus resembles a mature Arctian perhaps as much as any Bombycid, but no particular genus, since the resemblance is only very general. Stoll's figure, before referred to, shows us a perfect Zygænid, evidently *higher* than Ctenucha which resembles strikingly *Halesidota* which is one of the *lowest* Arctian genera. If we follow the general law of embryology too rigidly in classification we shall be led into occasional errors.

PUPA, female. The pupa is short and thick, approaching rather closely in form that of the Arctians, being shorter than that of Eudryas. Seen from above the body is of nearly equal thickness from the thorax to the fourth abdominal ring, thence it diminishes a little in size, until at the eighth ring it suddenly terminates in a mucronate point. At the third abdominal ring however the body is somewhat swollen.

The head is of good size but not at all prominent, very slightly projecting beyond the pro-thorax, with which it is very continuous since there is no clypeal tubercle. The vertex (epicranium and occiput) forms a continuous piece with the clypeus; next to the pro-thorax it spreads out, and has a slight

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mesial ridge, continuous with that of the pro-thorax. The scutellate clypeus is as long as the base is broad, the sides narrow somewhat towards the square front edge. There is an appearance of a short transverse oblong piece like that in the pupa, (the clypeus-anterior Newport?) to which are attached the minute triangular labrum, and on each side are the mandibles, whose form cannot be distinctly made out. The space between them is filled in with a piece whose surface is longitudinally convex.*

The eyes cover a much broader space than in the imago but are flatter, from their under side depend the broad flattened maxillæ, whose bases are excavated next the eyes, the inner side being the longer, and between them is a minute triangular piece, the homologue of which in the imago we do not know. They do not extend along the abdomen quite so far as the antennæ, whose tips partially embrace them. The antennæ are crossed by the sutures which define the joints, which are very short. Only two pairs of legs are exposed in the pupa. The hind pair are long and narrow especially towards their base, while the more anterior (probably the first pair) are twice as broad as the others near their base. All these appendages with the wings extend as far as the posterior edge of the fourth abdominal ring.

The wings are not broad, and the outer edge is much more oblique than in Eudryas.

The thorax is very short. Pro-scutum consisting of the two scales united into one piece by a raised median line; convex behind, in front deeply excavated by a triangular incision. The surface of the meso-scutum is very convex, the hind edge rounded and encroaching deeply into the meta-scutum, which is very short, expanding triangularly on the sides.

On the sternal side of the ninth ring are seen the traces of the genital armor of the imago, consisting of two triangular pieces closely approximated upon the mesial line of the body, appearing as if coming out from under the eighth ring, since the ninth is carried under the preceeding one at this point. A longitudinal impressed line in the middle of the tenth ring marks the site of the anal opening. The two minute obtuse

* The accuracy of this description of the mouth-parts will have to be tested by renewed observations The *supposed* division of the clypeus into two pieces, which do not appear in the imago, is of great interest in a morphological point of view.

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spines which are very closely united terminate the obtuse tip of the abdomen, and are no doubt homologous with the supraanal plate of the larva.

The surface of the pro-thorax and abdomen is finely punctured. The color of the pupa is a uniform dark shiny mahogany.

Length, .65; breadth, .20 inch.

While the form of the pupa of Arctia Isabella is almost identical in its general outlines and proportions with Ctenucha, there are still important differences which it will be interesting to notice. The head parts are less distinctly marked; the vertex and clypeus are broader; the antennæ and legs are very much shorter, not reaching to the ends of the wings, which meet in front of them, and are united at their tips by a distance equal to the length of the fourth abdominal ring. The wings of Arctia have the outer edge very much less oblique than in Ctenucha, the thorax is much longer throughout; the female genital armor is the same, though the ninth ring is longer, and the supraanal spine is a large flattened single stout spine, its edges terminating in two slender small spines.

One imago died just as it was breaking through the pupa case, affording a means of ascertaining the mode of exclusion of the imago. The meso-scutum was split widely apart, throwing the pro-thorax with the head and its mouth-parts forward and downwards; this act likewise forced outwards and downwards the wing, thus allowing the feet and wings of the immature imago to become exposed to the air long enough to harden, and thus serve to aid the moth in freeing itself from the rest of the body, which remains whole, after the moth has escaped from it. The antennæ were also drawn out and extended in front of the head; to effect this, the eyes of the pupa were evidently separated from the pro-thorax, thrust downwards by a space equal to the width of the antennæ, which were then enabled by the splitting asunder of the antennæ and wings of the pupa, to be extended forward.

By the pectinations of the antennæ, the specimen is evidently a female, its genital armor agrees exactly with that of the pupa above described, so that the sexes of the two are the same.

The hairs of the body within the pupa case are the same in density and coloration as in the mature moth.

Scepsis Walker.

The head is larger in proportion to the rest of the body than

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in Ctenucha, since it is a little broader than the pro-thorax, while in Ctenucha it is not as broad. The vertex is not so thickly scaled, the front edge of the clypeus is broader and straighter, thus making the whole clypeus square, as long as broad since the sides do not narrow so much as usual towards the front edge. Upon removing the scales, the occiput and epicranium are together equal in length to the clypeus. The occiput is transversely oblong, and divided by a mesial impression into two halves, considerably shorter than broad. The epicranium is subtrapezoidal, narrowing rapidly in front, and bilobed anteriorly by a deep mesial impression. The two ocelli are situated, not on either of the pieces, but just below the antennæ, and at each side of the suture between the two above mentioned pieces. The clypeus is a little longer than broad. At its base it is obtusely angular between the antennæ; its sides narrowing slightly towards the front edge, which is nearly square. On the basal half of the piece is a narrow ridge. Mandibles very slender, directed outwards, with long fine dense bristles. Labrum small, equilaterally triangular. Maxillæ well developed, reaching when unrolled beyond the base of the abdomen.

Antennæ like those of Ctenucha, but with longer and more hairy pectinations. In the female the pectinations are stouter, clavate, ending in setæ which are more apparant than in Ctenucha. Palpi ascending, acute and slender, reaching beyond the front by a distance equal to that between the bases of the antennæ. Thorax rather slender, a little longer than broad. The scutal pieces of the pro-thorax are united closely along the medial suture, each half not being so separate, or so orbicular as in *Ctenucha*. The patagia are narrow, not reaching to the end of the meso-scutellum. Owing to the thin scanty squamation the form of the tergal pieces of the thorax can be very distinctly seen: the meso-scutellum is hardly as long as broad, and is very obtusely pointed behind. It is much narrower and longer than in Ctenucha: so also the meta-scutellum, which is rounded behind, and very slightly produced into a slight obtuse angle.

Primaries three times as long as broad, being long and narrow. Costa straight to the outer third, where it is curved slowly around to the somewhat produced apex. Outer margin one-half as long as the inner, very oblique.

The costal nervure terminates at the outer third of the wing, and runs very close throughout its length to the edge of the

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wing. First subcostal arises very near the upper discal; second subcostal arises a little beyond the middle of the first subcostal; third subcostal is short, and arises a little beyond the middle of the distance between the apex of the wing and the origin of the upper discal nervule. The fourth subcostal branches off very near the apex, and is very short, being but one fourth as long as the fifth subcostal, which last arises at a less angle from its nervure than in Ctenucha. The discal nervules are much more curved inwards than in Ctenucha. The median beyond where it throws off its fourth median is bent upwards exactly parallel with the costa. Though longer, the nervules are thrown off from the nervure much as in Ctenucha, but the distance between the origins of the third and fourth median is proportionally greater than in Ctenucha.

Secondaries not quite half as broad as they are long, being much produced towards the apex, and behind reaching to the basal third of the abdomen. Costa straight, convex near the base. Apex acute. Outer edge nearly three times as long as the inner; straight on the outer half of its length, but becoming a little convex towards the internal angle, which is well rounded, while the inner edge itself is straight. The subcostal goes remarkably straight to the apex where it curves a little downwards; it throws off a single straight nervule a little within the outer third of its length. The upper discal is a third longer than the lower, which is the stouter of the two The three first medians are very short, one third as long as the whole median, the third shortest. First curved, second and third straight, fourth curved downwards near its origin. The submedian is obsolete at its basal third, the terminal portion being more like a nervure than a mere fold. It is close to the internal and remote from the median. Internal straight, cutting off a large triangular area comprising the internal angle.

Legs rather long, slender, thinly scaled, the spines minute and weak. The hind legs differ from Ctenucha in being much slenderer not at all swollen. There are the same proportions in the length of the joints.

Abdomen broad, and acutely pointed at the tip in both sexes, with slight lateral tufts along the sides. The female tip is more obtuse than in the male, thus approaching female Procris with its truncated tips, more than Ctenucha with its simple pointed tip. The genitals are simple and concealed within the eighth ring of the abdomen. There is apparent a tergal piece, and a sternal

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pair of short clavate appendages. Without more alcoholic specimens of this and the other genera it is useless to study these parts, which a casual inspection of dry specimens assures me afford excellent generic and specific characters in this family.

In coloration it differs from Ctenucha in the saffron pro-thorax, and dark head, and the semihyaline secondaries.

While at first sight distinguished from Ctenucha by its long wings and slender body, and obtusely pointed, almost triangular tip of the abdomen, and the difference in the tergum of the thoracic rings, there are additional characters which separate the two genera, and show conclusively that *Scepsis* should be considered as a group of equal value with Ctenucha itself, and not a subgenus of it. These are: the curved palpi which are considerably shorter; the thicker clavate pectinations of the antennæ, the marked differences in the neuration, and the slender hind femora. The clypeus is much wider, and the mesial ridge is not so prominent or so long as in Ctenucha, the clypeus of which narrows much more rapidly towards the front edge.

To show how accurately, in insects at least, the generic characters can be discovered from the inspection of a single species of the group, I would state that the above description was drawn up from specimens of *S. fulvicollis* only. Upon comparing afterwards specimens of a Californian species in the Museum of Comparative Zoölogy at Cambridge, which is closely allied to the species first mentioned, I find that the characters considered above as generic will in no case have to be altered. In the Californian species the style of coloration is the same, the palpi are a little more curved, the antennæ are the same, so also the pro-thorax, the neuration is identical throughout, and there is the same broad obtusely pointed tip of the abdomen. The specific distinctions are these; a light tint of brown, a brownish abdomen, instead of deep blue, and a more hairy thorax than in *S. fulvicollis*; while in size, the two species are much alike.

Scepsis fulvicollis Walker is found in Canada West (St. Catharines, Coll. S. H. Scudder) It will no doubt occur in southern New England.

Lycomorpha Harris.

The front of the head is provided with long scales extending to the base of the maxillæ. When the head is denuded, the clypeus is broadly scutellate, the length being equal to the

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breadth, with the basal margin produced backwards and encroaching more upon the epicranium than usual. The front edge contracts suddenly into a square portion resting above the mandibles and maxillæ. The epicranium is small and short, deeply impressed by a mesial line and divided thereby into two triangular halves; while the occiput is transversely oblong, being twice as broad as long.

The antennæ have short setiferous densely scaled pectinations; in the female they are serrated, the teeth terminating in single setæ. Mandibles rather long and slender projecting out beyond the scales of the front.

The body of this genus is long and narrow, slender. The thorax is narrow, and the pleuræ of each thoracic segment are very oblique. Pro-thoracic scales (being the two halves of the pro-scutum) ovate elliptical. The meso-scutum is remarkably small, being shorter than broad, and no longer than the scutellum, which is of much greater length than usual. The form of this last piece is much different from what we find in *Ctenucha*. In form it is pentagonal, the front edge being transverse, the two posterior sides forming a triangle, while the two anterior sides are, though nearly parallel, yet slightly divergent. Wings remarkably long and narrow: primaries nearly three times as long as broad, being remarkably long and narrow as in the Lithosiæ. Costa straight as far as the apex, which is much rounder than usual, as is also the internal angle, while the inner edge is but one-fourth shorter than the costal. The nervules arise remarkably equidistant, and their origins are much shorter and nearer the outer edge than in the allies of the genus. The short subcostal nervules run rapidly to the costal edge. First, second, and fifth of equal lengths, the third not branched and equal in length to the fourth, while the origins of each are opposite the inner third of the fifth, which arises near the middle of the discal space. Two discal nervules of equal length meet to form an angle pointing inwards, from which a fold is thrown inwards along the middle of the discal space.

Median nervules much straighter than usual, their interspaces oblong and of very equal size. Origins of second, third and fourth equidistant. Submedian nervure long and distinct.

Secondaries long and narrow, the apex much produced, the inner angle not reaching to the tips of the abdomen. Costa convex, a little excavated just before the apex. Outer margin two-thirds as long as the costa, angulated slightly on the second

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median. Inner edge very short, being one-half as long as the costal. First and second subcostal nervules nearly equal in length. The upper discal is very long and oblique, and with the lower discal is parallel with the outer edge of the wing. But three median nervules present. First, obsolete; second and third parallel; third and fourth shorter than the second and directed downwards. Distance between the two first median nervules one-third as great as that between the third and fourth.

The slender abdomen is a little more than twice the length of the head and thorax. The male genital armor is large and well developed in the genus. The two tergal pieces consists of a semielliptical horizontal piece, beneath which comes out another tergal piece of the same length, but linear, and curving downwards and inwards. The side pieces are large, concave, broad and long, nearly meeting beneath, along the mesial line of the body. Each piece is widest in the middle, thence narrowing rather rapidly, becomes truncate at the extremity, ending in a pair of hooks separated by a deep sinus.

The coloration is prussian blue, with saffron bases to the wings, somewhat as in *Pyromorpha*.

Compared with other genera of the subfamily this interesting genus presents some notable differences, all the characters being, as it were, influenced by the close relationship to the Lithosiæ. This is seen in the dentated antennæ, neither simple as in the Lithosiæ, or pectinated as is the rule in its own group. The Lithosian characters also appear in the head, in the form of the clypeus especially; and in the unusually slender body, with its narrow wings, and elongated scutellum of the mesothorax. Though after all the Zygænid characters prevail so extensively that it is a little strange that observers after Dr. Harris' time should change his location of the genus to a place among the Lithosiidæ. Though the larva is a lichen-feeder and thus in this early stage is like Lithosia and allies, we must consider the insect as simply analogous in its habits as well as structure to that genus, and not be misled by these very strong resemblances.

I have taken *L. Pholus* on the wing in the daytime about stone walls on which lichens were plentiful, in Brunswick, Maine.

ANATOLMIS nov. gen.

Head of moderate size, broad and short. Occiput and epicranium together equal in length to the clypeus; epicranium

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bilobate, much as in *Lycomorpha*, with much the same proportions. The clypeus is very broad, scutellate, just as broad as long, covered with broad flat scales which converge towards the median line. Eyes small, hemispherical, their diminished size adding to the breadth of the broad clypeus between them. Antennæ situated nearly midway between the front edge and the base of the head; rather slender, with very short broad pectinations, equalling in length the joints, and covered densely, especially on the sides, with stout hairs, and terminating in a single seta. Maxillæ well developed, longer than the head is broad. Palpi long porrect, reaching beyond the front: third joint minute conical subacute, nearly continuous with the second, which is not very broad.

Body slender, thorax not much broader than abdomen; wings remarkably long and narrow. Primaries a little more than three times as long as broad; costa very straight, a little convex on the outer third; apex rounded; outer edge very convex, very short; inner edge remarkably long, and nearly parallel with the costa, very straight, the usual convexity near the insertion very slight.

Costal very near the margin and impinging on the middle of the first subcostal; third subcostal of very equal length, first curved towards the costa, the third shorter than first; fourth branched within its middle, enclosing a narrow long triangular apical interspace; fifth, not removed from its nervule at its origin. Median nervules arise at the outer third of the wing. First and second are united at their base; third and fourth, are equidistant from the second. Submedian curve long well marked, but no nervure. Very long internal nervure. Fringe rather long, especially just below the apex.

Secondaries very long, twice as long as broad, narrow triangular, hardly reaching to tip of abdomen. Apex much produced, though obtuse. Costa very straight, outer edge very long, remarkably straight, internal angle rectangular not reaching much beyond the base of the anal tuft.

Subcostal subdivides near the outer fourth of the wing; first and second median very short, nearly parallel; third, very remote but of the same length.

Legs long and slender, finely scaled. Hind tibial spurs very small unequal acute, inner pair very remote, and half as large as the terminal pair. Tip of abdomen provided with large anal valves, of unusual size, being laterally broad lanceolate.

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The squamation is fine and powdery. Compared with *Lycomorpha*, to which it is nearest allied, besides the very different style of coloration, the primaries are narrower, costa straighter; secondaries more triangular, owing to the rectangular inner angle. But in the structure of the head, of the antennæ, of the thorax and abdomen it agrees closely with *Lycomorpha*, and these characters are those which place it without doubt in the Zygænidæ, though after a casual glance one would not hesitate to call it a Lithosian. The bluish scales of the body, the dark mahogany colored tegument, the fine powdery squamation, and the slender very equally jointed legs and pectinated antennæ aid in determining the true systematic position of this interesting genus.

From the resemblance to the parallel genera *Hypoprepia* and *Atolmis*, among the Lithosiidæ, I have proposed the name above given.

A. Grotei nov. sp. Vermillion red and smoky purple; head and appendages purple, thorax red; primaries red throughout except the purple fringe and the edge of the outer third of the costa. Secondaries red on the basal third, beyond smoky purple; the red extends from just within the middle of the inner edge to near the apex upon the costal edge. Legs purple, concolorous with the abdomen. Beneath colored the same as above. There are no other markings on the wings.

Length, .38; exp. wings, 1.20 inch.

Pike's Peak, Colorado Terr. (Coll. Phil. Ent. Soc.)

Dedicated to Mr. A. R. GROTE, to whose kindness in securing for study this and many other rarities I am under special obligations.

EXPLANATION OF THE PLATES.

PLATE I. Fig. 1. *Ctenucha virginica* Grote. 1*a*, Palpus enlarged. 1*b*, Head denuded and enlarged. 1*c*, Primary wing. 1*d*, Secondary wing.

Fig. 2. Larva seen from above. 2*a*, side view. 2*c*, front view of head enlarged. 2*d*, last abdominal ring seen from above.

Fig. 3. Young larva, after the fourth moult.

Fig. 4. Pupa seen from above. 4*a*, side view.

PLATE II. Fig. 1. *Alypia octomaculata* Hubner, head denuded and enlarged. 1*a*, Primary wing. 1*b*, Secondary wing.

Fig. 2. Pupa of *Eudryas grata* Boisduval. 2*a*, dorsal view.

Fig. 3. Head of the same, denuded and enlarged. 3*a*, Primary wing. 3*b*, Secondary wing.

Fig. 4. *Lycomorpha Pholus* Harris, head denuded and enlarged. 4*a*, Primary wing. 4*b*, Secondary wing.

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IV. *Catalogue of the Birds found at Springfield, Mass., with Notes on their Migrations, Habits, &c.; together with a List of those Birds found in the State not yet observed at Springfield.* By J. A. Allen.

(Communicated May 2, 1864.)

Nearly all the land birds known to inhabit New England are found in the Valley of the Connecticut, at one season or another; and during spring and fall the number of passengers from the northern to the southern parts of the country, and *vice versa*, is immense; even some of those species usually esteemed quite rare occur in considerable numbers. The number of individuals of land birds, during the periods of migration, seems to be much greater at Springfield than at most localities in the eastern part of the State; yet some species are more numerous in Eastern Massachusetts than at Springfield; and some are common there through the breeding season, which at Springfield are almost unknown, or at least occur in much fewer numbers. Among such may be mentioned *Coccyzus americanus*, *Hirundo bicolor*, *Carpodacus purpureus*, the *Ammodromi*, &c. The rapacious birds, owing to the absence of extensive woods, are comparatively rare, especially in summer and winter, and the water birds are limited to the fresh water or river Ducks and Grallæ, which are, with few exceptions, far from numerous.

Among some of those species noticed as of very rare occurence here, may be mentioned *Nyctale Richardsonii*, *Picoides arcticus*, *Centurus carolinus*, *Helminthophaga peregrina*, *H. celata*, *Dendroica tigrina*, *Icteria viridis*, *Mimus polyglottus* (found breeding), *Melospiza Lincolnii*, *Coturniculus Henslowii*, *Corvus carnivorus*, &c. The "*Turdus aliciæ*" of Baird, I have found to be not rare; and from a careful examination of many specimens of both *T. aliciæ* and *T. Swainsonii*, have found *aliciæ* to be based on faintly colored specimens of *Swainsonii*, and not to be a distinct species, as heretofore

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supposed. This subject is noticed at length under *Turdus Swansonii.*

Springfield being situated near the northern confines of the Alleghanian Fauna, some of the more southern species found here are represented merely by a few individuals in the breeding season, while the southern limit of many others properly belonging to the Canadian Fauna is removed but a few miles to the north, varying from sixty to one hundred miles in the Valley of the Connecticut, and in the mountainous districts of Western Massachusetts falls nearly as low as Springfield.

I have designed to include no species, in the following list, which I have not known taken or observed in the immediate vicinity of Springfield, (except in the case of a few Ducks, noticed below,) preferring to err in omitting some really existing in the prescribed region than to include a single species not belonging to the locality. I have introduced, however, those very probably occurring, which have not, to my knowledge, been observed here ; but these are not reckoned as a part of the list. The times of migration given are generally an average of observations covering several years.

In order to render the list as complete and valuable as possible, I have not failed to solicit aid from others, and am pleased to be able to acknowledge valuable assistance; chiefly from Messrs. C. W. Bennett and L. Hyde, whose very complete collection of our native birds forms a valuable part of the collections of local natural history in the "Ethnological and Natural History Museum" established a few years since in Springfield; to Mr. B. Hosford, for various useful notes, and to Dr. Wm. Wood, of East Windsor Hill, Ct., who has kindly furnished me with many valuable facts, particularly in reference to the water birds. The names of contributors follow the facts resting on their authority. Several of the Ducks included in the list, (*Aythya vallisneria*, *Bucephala albeola*, *Harelda glacialis*, *Melanetta velvetina*,) are inserted from their having been taken on the Connecticut River, by Dr. Wood, some fifteen miles below Springfield; and though not known to have been taken here, undoubtedly occur, and have only been overlooked from a want of more thorough searching on the part of collectors. The whole number of species included in the Springfield list is one hundred and ninety-five ; the number of those found in Massachusetts not observed at Springfield is ninety-two, of which the greater part are truly coast species.

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In order to give a complete list of the birds of our State, I have appended a catalogue of those found in Massachusetts not yet noticed at Springfield. No species is included of which there is not good evidence that it has been taken in the State. Some occasional visitors may have been overlooked, but it is believed such instances are few. Those probably occurring but not to my knowledge detected, are also mentioned but are not counted as a part of the list. To present a general view of the Ornithology of our State in a condensed form, I have appended tabular lists of those birds that are resident the whole year in the State, those that breed, those that are summer, winter, or spring and autumn visitors, and those that are merely rare, occasional, or chance visitors, &c.

1. *Falco anatum* Bonap. Duck Hawk. Very rare. One or two pairs are known to breed regularly on Mount Tom, some fifteen or twenty miles north of Springfield. Nest on the rocks, very early in the season, the young being full grown by the last of June. Mr. C. W. Bennett, who gives me these facts, took some young birds from the nest a few years since. This species has also been found breeding on Talcott Mountain, Ct., a few miles south-west of Hartford. Four nearly full-fledged young were taken from the nest June 1st, 1861, and the female was shot.* (Dr. W. Wood, in Hartford, Ct., Times, June 24th, 1861. See a valuable series of twenty-one articles, by Dr. Wood, on the Rapacious "Birds of Connecticut," published in the Hartford Times, March 14th to August 9th, 1861.)

2. *Hypotriorchis columbarius* Gray. Pigeon Hawk. Very rare. Seen in spring and fall. May 7th, 1861, obtained a male in perfectly adult plumage.

3. *Tinnunculus sparverius* Vieill. Sparrow Hawk. Not common. Seen in spring and fall. Has been found breeding at Williamstown, Mass. (Brewer's N. Am. Oöl. pt. I. p. 17.)

4. *Astur atricapillus* Bonap. Goshawk. "Partridge Hawk." Winter visitant. Usually rare, but was quite common in the winter of 1859–60. Arrives about the first week in November.

* Since the above was written, the eggs have been obtained (April 19th, 1864,) from a nest on Mount Tom, by Mr. C. W. Bennett, of Springfield. The female was also obtained, and the identity of the eggs ascertained beyond question.

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5. *Accipiter Cooperii* Bonap. Cooper's Hawk. "Chicken Hawk." Common summer visitant, breeding, but is most numerous in September.

6. *Accipiter fuscus* Bonap. Sharp-shinned Hawk. "Pigeon Hawk." Summer visitant, breeding; common, particularly in spring and fall.

7. *Buteo borealis* Vieill. Red-tailed Hawk. "Hen Hawk." Probably resident, but most numerous in fall and spring, and breeds here.

8. *Buteo lineatus* Jard. Red shouldered Hawk. Not uncommon, arriving early in spring, and breeds here. Is most common in autumn, when those that breed further north are migrating southward.

9. *Buteo pennsylvanicus* Bonap. Broad-winged Hawk. Quite rare; breeds.

10. *Archibuteo lagopus* Gray. Rough-legged Hawk. Winter visitant. Not common, except occasionally, and in particular localities.

11. *Archibuteo sancti-johannis* Gray. Black Hawk. Rare winter visitant.

12. *Circus hudsonius* Vieill. Marsh Hawk. "Blue Hawk." "Bog-trotter" of sportsmen. Common summer visitant; arrives early in March, and nests on the ground in the marshes, often many years on the same site. It is by far our most common Hawk. Both sexes incubate.

13. *Haliætus leucocephalus* Savigny. White-headed Eagle. "Bald Eagle." Not common; sometimes breeds on Mt. Tom, about twenty miles north of Springfield

14. *Pandion carolinensis* Bonap. Fish Hawk. A few are seen along the Connecticut and its tributaries during the spring months. Have never heard of its breeding in this vicinity.

15. *Bubo virginianus* Bonap. Great Horned Owl. "Cat-Owl." Rather common. Resident, but seems to be more common in autumn and winter.

16. *Scops asio* Bonap. Mottled or Red Owl. "Screech Owl." Resident, and probably our most common species of Owl.

17. *Otus americanus* Bonap.*. Long-eared Owl. Not

* *Strix americana* Gmelin, Syst. Nat. I, (1728) 288; *Otus Wilsonianus* Less. Traité d'Orn., I, (1832) 130.—Why the specific name *americanus* has not been adopted for this species by the later ornithologists I cannot perceive, it being that having the priority of all others.

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common. Probably resident, but most frequently taken in autumn.

18. *Brachyotus Cassinii* Brewer. Short-eared Owl. Resident. Rather common in autumn and winter. Dr. Wood has found it breeding in Connecticut, a few miles from Springfield.

19. *Syrnium nebulosum* Gray. Barred Owl. Quite common. Resident.

The Great Gray Owl (*S. cinereum* Aud.) may occur occasionally, but I have never known it taken here.

20. *Nyctale acadica* Bonap. Acadian Owl. "Little Owl." Pretty rare. Resident.

21. *Nyctale Richardsonii* Bonap. Richardson's Owl. Very rare winter visitant. Obtained a specimen in December, 1859. A specimen in the Museum of Comparative Zoölogy, Cambridge, taken at Malden, Mass., and one taken by Dr. W. Wood, in East Windsor, Ct., were obtained the same winter.

22. *Nyctea nivea* Gray. Snowy Owl. Winter visitant, and usually rare; in some winters quite common. Has been taken third week in November.

23. *Coccygus americanus* Bonap. Yellow-billed Cuckoo. Extremely rare; in the eastern part of the State it occurs frequently. Though it has been an object of special search with collectors here for several years, but one specimen has been obtained. Dr. Wood says it is "very rare" at East-Windsor Hill, Ct., where he has found its nest and eggs.

24. *Coccygus erythrophthalmus* Bonap. Black-billed Cuckoo. Rather common summer visitant, arriving about May 10th.

25. *Picus villosus* Linn. Hairy Woodpecker. Resident, but quite rare in summer; more common in winter.

25. *Picus pubescens* Linn. Downy Woodpecker. Resident, and common at all seasons.

27. *Picoides arcticus* Gray. Black-backed Three-toed Woodpecker. A very rare or accidental winter visitant. The only specimen I have *known* taken here I shot in January, 1860; a Woodpecker, however, was seen here for several weeks in March of the same year, which I think, from descriptions of it, must have been this species.

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28 *Sphyropicus varius* Baird. Yellow-bellied Woodpecker. Not common, and only seen in fall and spring when migrating. I have never seen this species in summer, and do not think it breeds here, though they breed plentifully on the hills in Western Massachusetts, twenty or thirty miles west of Springfield. (W. H. Niles.)

29. *Centurus carolinus* Bonap. Red-bellied Woodpecker. Summer visitant. Accidental. Saw one May 13th, 1863. It has been taken several times in Connecticut, but occurs in New England only as a straggler. Found in the breeding season in Western Massachusetts by Prof. Emmons. (Peabody's Rep. on the Birds of Mass.)

30. *Melanerpes erythrocephalus* Swain. Red-headed Woodpecker. Very rare summer visitant. Have taken but two specimens in five or six years. Three were taken in 1860 by Messrs. Bennett and Hyde. A few are still known to breed within about twenty miles, in several directions, (at Amherst, Mass., C. W. Bennett.) Twenty-five or thirty years ago they were very abundant here.

31. *Colaptes auratus* Swain. Golden-winged Woodpecker. "Yellow Hammer." "Wakeup." Summer visitant, breeding very abundantly. Arrives about the first of April or last week in March; leaves about October 12th.

32. *Trochilus colubris* Linn. Humming Bird. Common summer visitant, breeding plentifully. Arrives early in May, and in August is very abundant wherever the *Impatiens fulva* abounds.

33. *Chætura pelasgia* Steph. Chimney Swift. "Chimney Swallow." Abundant. Usually arrives about the first of May, but are frequently seen the last week in April; greater part leave early in September, but some often remain till the middle of September, and even sometimes till near the first of October. Arrives earlier and commonly remains later than any of the true Swallows, except perhaps *Hirundo bicolor*. Raises two broods, the last young sometimes not leaving the nest before August 15th or 20th.

34. *Antrostomus vociferus* Bonap. Whip-poor-Will. Common summer visitant, arriving about April 25th. A few of the males are musical till into September; have heard them throughout the summer till September 25th, about which time they leave us.

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35. *Chordeiles popetue* Baird. Night Hawk. Common summer visitant Arrives early in May, and departs south early in September. Many leave in large straggling parties during the latter part of August.

36. *Ceryle alcyon* Boie. Belted Kingfisher. Common. Chiefly a summer visitant, arriving in March, but a few usually remain about open streams during winter.

37. *Tyrannus carolinensis* Baird. King Bird. Summer visitant, breeding very abundantly. Arrives about May 10th, and departs early in September; usually by the 10th or 12th, sometimes by the 1st.

38. *Myiarchus crinitus* Cab. Great-crested Flycatcher. Rare summer visitant Have taken it May 15th, and Sept. 17th. Breeds on Mt. Tom (C. W. Bennett), and in some other parts of the State.

39. *Sayornis fuscus* Baird. Pewee. Phœbe. Common summer visitant, arriving about the last of March. Begins nesting in April, and have found freshly laid eggs the middle of August, it raising two, perhaps occasionally three, broods, in a season.

40. *Contopus borealis* Baird. Olive-sided Flycatcher. Summer visitant; not very rare. Arrives about May 12th, and breeds in high, open woods, far away from which it is seldom seen. Leaves about the middle of September.

41. *Contopus virens* Cab. Wood Pewee. Very common summer visitant, breeding in the open woods quite abundantly, and occasionally in orchards. Arrives about May 15th, and leaves September 10th to 15th.

42. *Empidonax Traillii* Baird. Traill's Flycatcher. Rather rare summer visitant; arrives May 10th to 15th, and probably breeds.

43. *Empidonax minimus* Baird. Least-Flycatcher. Abundant summer visitant. Arrives the last of April; sometimes as early as April 20th. Most abundant in orchards and cultivated grounds, where it commonly breeds, but also frequents open woods. Leaves before, or by, the middle of September. Exceeds in abundance all the other *Empidonaces* taken together.

44. *Empidonax acadicus* Baird. Acadian Flycatcher. Rather rare summer visitant. Breeds in swamps and low

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moist thickets, which are its exclusive haunts. Under *Muscicapa querula* (Small Green-crested Flycatcher), Wilson, in a few words, has very correctly indicated the habits and notes of this species. It is the most spirited and tyrannical of all our *Empidonaces*, with which its sharp, quick note, like *quequeah*, uttered sharply and hurriedly, and its erect, Hawk-like attitude eminently accord. It is very quarrelsome with its own species, a battle ensuing whenever two males meet; they pursue each other fiercely, with snapping bills and sharp querulous twittering notes. It is also a very shy and difficult bird to collect, frequenting exclusively, so far as I have observed, thick alder swamps and swampy thickets, keeping either concealed among the thick bushes, or at too great a distance from the collecter.

45. *Empidonax flaviventris* Baird. Yellow-bellied Flycatcher. Rare. Have taken it from May 15th to June 5th.

46. *Turdus mustelinus* Gmelin. Wood Thrush. Summer visitant, arriving May 1st to 10th. Not common, usually breeding in deep, moist woods. Is more terrestrial in its habits than the other Wood Thrushes.

This species has commonly been described by authors as remarkable for its shyness of man, and for selecting for its haunts the most secluded woodlands; and though this is generally true, there are some noteworthy exceptions. So far as I have seen, however, it is not so recluse in its habits as has been very generally supposed; having found it (in May) where there were but few trees and a scanty undergrowth, and even within the limits of a thickly peopled village. Mr. W. H. Hall has informed me of a nest of this species, which he found in the summer of 1861, built within a few yards of the road leading up Mt. Holyoke. For three successive summers a single Wood Thrush has lived among the elms and maples of Court Square, Springfield, spending the whole season in its immediate vicinity, pouring out his melodious strains at early dawn, and at various hours of the day till late in the evening, as wholly undisturbed by the people on the walks beneath him, or by the noise and rattle of moving vehicles in the contiguous streets, as though in the usual wild-wood haunts of his species. His superior musical powers have caused him to become a well-known and protected favorite with the people, familiarly searching for his food along the gravel walks of the Square.

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47. *Turdus Pallacii* Cabanis. Hermit Thrush. Abundant in spring and autumn. Seen in small parties from April 15th to May 10th in spring, and in fall from October 1st till November, sometimes till the 10th, commonly in swamps and low woods, and occasionally in open, plowed fields. Never sings while here, and is quite unsuspicious. Have not found it breeding here.

48. *Turdus fuscescens* Stephens. Tawny Thrush. Wilson's Thrush, Veery. Abundant summer visitant. Breeds in swamps and low woods, nesting on or very near the ground, beginning to sit the first week in June; have found its eggs May 29th. Arrives about May 10th, and leaves early in September. During the summer months is quite arboreal in its habits, collecting a large part of its insect food among the foliage of the trees. It is the most numerous here of all the woodland Thrushes, and the only one that breeds here in abundance, and the only one, excepting *T. mustelinus*. Have found three nests in an hour's walk.

49. *Turdus Swainsonii* Cab. (*Turdus Swainsonii* and *T. aliciæ* of Baird.) Swainson's Thrush. Olive-backed Thrush. Common in spring and fall. Seen in spring from May 15th to June 3d; usually in small parties about woodlands, but often frequents open fields, and even gardens; is quite unsuspicious, and seldom sings while here.

After a critical examination of a very extensive series of specimens, including many fresh, I am forced to the conclusion that *T. aliciæ* and *T. Swainsonii* form but one species. I have carefully studied the bills, feet, wings, size, and proportions for specific differences, and find that, though there is more or less variation in all these, as there is among individuals of almost every species, there is nothing that approaches to constant specific difference. Indeed, the principal character that has ever been urged as separating them is that of the color. But this I find is not a constant character. I have had specimens before me during the last year exhibiting every gradation in the color of the breast, sides of the neck, eye circle, &c., from the strongly buff-tinted of the true *T. Swainsonii* to the pale gray of the typical "*aliciæ*," where the buff was scarcely perceptible or quite obsolete.

Prof. Baird, in his original description of *aliciæ* (*P. R. R. Exp. and Surv.* IX. 217) observes: "These parts [sides of the neck and breast] are not of as pure white as the belly,

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having the faintest possible shade of yellowish red, but it is barely appreciable, nor is it any more distinct in raising the feathers. There is the faintest possible shade of reddish in the tail and its coverts above, but this is only to be observed on a close examination. This species comes much nearest to *Turdus Swainsonii*, the Olive-backed Thrush, agreeing with it in the dark greenish olive of the upper surface. This, however, is decidedly darker, and showing a clearer greenish than usual in the other. The absence of any buff on the throat, breast, and sides of the head, and the predominating ashy on the latter, with a white ring instead of a reddish yellow round the eye, are strong points of distinction. The bill appears more slender, and the whole bird is larger. It is barely possible that it may constitute a variety only of *T. Swainsonii*; but if so a very strongly marked one."

Detecting *T. "aliciæ"* among specimens I had collected, and many specimens intermediate in color between this form and strongly marked *T. Swainsonii*, I began to search for some more constant character than color to separate the two forms; and found by extensive measurements that both the largest and the smallest specimens occurred in the form recognized as *T. Swainsonii*, though some *T. aliciæ* were larger than the average of the series. On comparing the proportions of the primaries, some *aliciæ* agreed with *Swainsonii* while others differed. Comparisons made between the bills, feet and other characters, gave similar results; while in color the majority of the specimens ranged *between* those having the greatest amount of reddish-yellow and those in which the buff was scarcely appreciable. The difference in color is merely one of intensity, dependent neither upon sex nor season, possibly upon age, and extends throughout the plumage; thus those that have the breast of the brightest buff, have also more of this tint pervading the whole plumage, the paler specimens being of the purest dark olive above, without the brownish cast observable in the more rufous individuals.

Among individuals of *Turdus fuscescens*, collected the past summer at Springfield, I have detected a difference similar in kind and as great in degree as that separating forms heretofore considered typical respec-

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tively of *T. Swainsonii* and *T. aliciæ*. Thus one specimen is very highly colored throughout, being very bright *reddish* brown above, and has the breast bright reddish buff, of about the same tint as in highly colored *T. Swainsonii*, and the spots very distinct, while the other is very pale throughout, being of a decided *yellowish* brown above, and has the breast pale buff, and the spots more indistinct than in the first. Both specimens were taken May 29th, 1863. The depth of color also varies more or less in different specimens of *Turdus Pallasii*, though hardly so marked as in *T. Swainsonii*; but even in *T. Swainsonii* the gradations from one extreme to the other are so minute and complete that the state described as *T. aliciæ* can now hardly be considered "a very strongly marked" variety.

50. *Turdus (Planesticus) migratorius* Linn. Robin. Abundant summer visitant. Are sometimes seen in February, but commonly arrive in March, from the 15th to the 25th. Are last seen in autumn from the 7th to the 14th of November. Breeds plentifully in orchards and gardens, often in the woods, and is a familiar inhabitant in the village and city. Have observed it at all seasons in the eastern part of the State, where many are resident. Some also spend the winter along the south side of Mount Holyoke, feeding on the berries of the red cedar.

51. *Sialia sialis* Baird. Blue Bird. Abundant, often arriving in February, and is generally common by the 15th to the 25th of March. Nests early, the first brood of young generally leaving the nest as soon as June 1st, and the second during the third week in July. Commonly leaves about the last week in October.

52. *Regulus calendula* Licht. Ruby-crowned Kinglet. Common spring and autumn visitant. Seen in spring from April 15th to May 12th; in autumn from October 1st to 20th. Have never seen it here in winter.

53. *Regulus satrapa* Licht. Golden-crested Kinglet. Abundant winter visitant. Arrives about October 1st, and departs north again about April 10th to 15th.

54. *Anthus ludovicianus* Licht. Titlark. "Sky Lark". Spring and autumn visitant. Seen for a week or ten days in the early part of October, often in large flocks, fre-

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quenting stubble and newly-plowed fields, and the muddy banks of streams and ponds; also for a few days in May.

55. *Mniotilta varia* Vieill. Black and White Creeper. Common summer visitant. Have found it breeding, nesting *on the ground.* It appears to nest in various situations, according to different observers; in hollow trees, on the ground, and in crevices among rocks. Arrives about April 25th, and for several weeks is very abundant, but the greater part going further north to breed, is not so common in summer, but becomes abundant again the last of August and early in September.

56. *Parula americana* Bonap. Blue Yellow-backed Warbler. Very common, particularly in May. Many remain through the summer and breed, nesting about June 1st. Seem to prefer high mixed woods and thick spruce and larch swamps, keeping almost wholly in the tops of the taller trees and near the extremities of their larger branches. On their first arrival, about May 5th, they frequent the orchards, and keep lower among the undergrowth in the woods than they do later in the season. Leaves 10th to the 15th of September.

57. *Geothlypis trichas* Cab. Maryland Yellow-throated Warbler. Summer visitant. Very abundant, breeding plentifully in all swampy situations, nesting on the ground. Arrives about May 10th, and leaves the first or second week in September.

58. *Geothlypis Philadelphia* Baird. Mourning Warbler. Very rare. Have taken two specimens about the middle of September. Five specimens of this Warbler were taken in Lynn, a few years since, from the 4th to the 29th of September, by S. Jillson. (Ms. notes of S. J.)

The Connecticut Warbler (*Oporornis agilis* Baird) may probably be found here as an extremely rare species, but I have not known it detected here.

59. *Icteria viridis* Bonap. Yellow-breasted Chat. Extremely rare. Has been seen here but a few times. In May, 1863, I saw a few pairs which appeared likely to breed here, but being harrassed and some of them killed, by collectors, the others sought a safer haunt. Was seen here in September, a few years since, by R. B. Hildreth, Esq.

60. *Helminthophaga ruficapilla* Baird. Nashville War-

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bler. Abundant in May, and in the early part of autumn. Arrives May 1st to 5th, and for two or three weeks is a common inhabitant of the orchards and gardens, actively gleaning insects among the unfolding leaves and blossoms of the fruit trees. Nearly all go north, but a few retire to the woods and breed. During June, 1863, I frequently saw them in my excursions in the woods, often three or four males in an hour's walk. Its song so much resembles the song of the Chestnut-sided Warbler (*Dendroica pennsylvanica*) that it might readily be mistaken for it. To this cause, and to the difficulty of seeing such small birds in the dense summer foliage, is doubtless owing the fact of its being so commonly overlooked by naturalists during the summer months, rather than to its extreme rarity in this latitude at that season. I have found the nest of this species for two successive seasons, as follows:—May 31st, 1862, containing four freshly laid eggs. The nest was placed on the ground, and sunken so that the top of the nest was level with the surface of the ground, and protected and completely concealed above by the dead grass and weeds of the previous year. It was composed of fine rootlets and dry grass, lined with fine dry grass and a few horse hairs, and covered exteriorly with a species of fine green moss. The eggs were white, sprinkled with light reddish brown specks, most thickly near the larger end. Longer diameter sixty, and the shorter fifty, one-hundredths inches. The following year, June 5th, 1863, I found another nest of this species, *within three or four feet of where the one was discovered the previous year*, and containing three eggs of this species and one of the Cow Bunting, in all of which the embryos were far advanced. The nest in every particular was built and arranged like the one above described, and the eggs must have been laid at just about the same season. In both cases the female bird was secured, and the identity of the nests ascertained beyond question. The locality of the nests was a mossy bank, at the edge of young woods, sloping southward, and covered with bushes and coarse plants. Probably the male of the first nest, mating again, selected the same site for the second nest; and it may have been occupied for a longer time.

61. *Helminthophaga celata* Baird. Orange-crowned

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Warbler. Very rare; perhaps accidental. Shot a single specimen May 15th, 1863. Saw quite a number of this species among the fruit trees of the garden and orchard, then in blossom, but thinking them only pale individuals of *H. ruficapilla*, which thronged every tree, I neglected at first to shoot. Finally, being strongly in doubt, I shot one, and the specimen proved to be *H. celata*, which, as the group immediately passed on to a piece of woods, was the only one I secured.

62. *Helminthophaga peregrina* Cab. Tennessee Warbler. Very rare. Have taken it September 19th, and May 29th.

The Golden-winged Warbler (*H. chrysoptera* Cab.) probably rarely occurs here, as it is occasionally taken in other parts of the State. Probably also the Blue-winged Yellow Warbler (*H. pinus* Baird) and the Worm-eating Warbler (*Helmitherus vermivorus* Bonap.) may yet be detected here, but they must occur only as very rare visitants. Of the *Helminthophagæ*, *H. ruficapilla* is abundant and breeds here, while all the others appear to be extremely rare.

63. *Siurus aurocapillus* Swain. Golden-crowned Wagtail. "Oven Bird." Very abundant summer visitant, breeding plentifully, in every thicket and patch of woodland. Arrives about May 10th, immediately making known its presence by its loud echoing song, heard everywhere in the deep woods. Leaves first or second week in September.

64. *Siurus noveboracensis* Nutt. Water Wagtail. Not uncommon in spring and fall, and apparently a few breed here, having seen them in June, July, and August; is very rare during the summer months. Arrives May 12th to 20th.

The Large-billed Water Wagtail (*Siurus ludovicianus* Bonap.) ought to occur here, but after several seasons of careful search I have not found it.

65. *Dendroica virens* Baird. Black-throated Green Warbler. Abundant in May, and the last week of August and the first part of September. Though some breed, it is not much observed in summer, as it keeps mostly in the tops of the trees in thick woods. Arrives May 5th and later, being most numerous in spring from May 15th to

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25th, when it is often seen in the gardens and orchards, gleaning insects among the opening foliage.

66. *Dendroica canadensis* Baird. Black-throated Blue Warbler. Common from May 15th to 25th, and again the fore part of September. Found in the breeding season on Mt. Holyoke (C. W. Bennett), and along the ridges in the western part of the State (B. Hosford).

67. *Dendroica coronata* Gray. Golden-crowned Warbler. Myrtle Bird. Yellow-rumped Warbler. Very abundant spring and autumn visitant. Commonly arrives first week in May, in great numbers, but generally passes rapidly northward, and is usually abundant but four or five days. Stragglers are sometimes seen the last of April, and a few as late as May 15th. Are often so abundant as to seem to be in an almost continuous loose flock, equally common in orchards, thickets, cultivated grounds and woodlands, keeping up a constant motion northward, others continually arriving to fill the places of those which have passed on. In autumn they are longer in passing, moving much more leisurely than in spring; are very abundant for ten days to two weeks in the fore part of October. Often alights on the ground, particularly in autumn, and is then rather more common about cultivated fields, flying along fences and hastening from field to field, than in deep woods. None breed here.

68. *Dendroica Blackburniæ* Baird. Blackburnian Warbler. Not very uncommon. Arrives about the middle of May. A few probably breed, having taken it here June 24th. Most common in mixed or hard wood forests. The nest was found in the eastern part of the State some years since, by Dr. Brewer. (Aud. Orn. Biog., vol. v., 73.)

69. *Dendroica castanea* Baird. Bay-breasted Warbler. Very rare. Have taken it May 20th and May 25th. One taken in July, 1862, by B. Hosford.

70. *Dendroica pinus* Baird. Pine Warbler. Very common, breeding plentifully. This is the earliest warbler to arrive in spring, except perhaps *D. palmarum*, and remains till the second week of October. In 1861, they were common in the pine woods April 4th, though the ground was covered with several inches of snow, some of which remained for a week after their arrival. During the last

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weeks of April and the early part of May they frequent open fields, obtaining much of their food from the ground, associating with *D. palmarum*, and at this time closely resembling it in habits. A little later they retire to the pine forests, where they almost exclusively remain during summer, keeping mostly in the tops of the taller trees. During a few weeks, about October first, they again come about the orchards and fields.

71. *Dendroica pennsylvanica* Baird. Chestnut-sided Warbler. Common. Arrives about May 9th, and many spend the summer and breed. Mostly frequents, in the breeding season, low woods and swampy thickets, nesting in bushes, and is not generally found much in high trees. Leaves early in September.

72. *Dendroica striata* Baird. Black-poll Warbler. Abundant spring and autumn visitant. Arrives the latest of the Warblers in spring, seldom being seen before May 20th, and remains till June 1st. None breed. In fall becomes common the latter part of September, and remains till the last of October.

73. *Dendroica æstiva* Baird. Yellow Warbler. Summer Yellow Bird. Abundant summer visitant, arriving early in May, and breeds in great numbers among the willows of river meadows, and among the fruit and ornamental trees of the city. Does not frequent the woods, and in many localities is rare, except in May, seeming to prefer the vicinity of water courses and alluvial meadows.

74. *Dendroica maculosa* Baird. Black and Yellow Warbler. Spotted Warbler. Common spring and autumn visitant. Seen in spring from May 15th to June 1st, and in autumn as late as September 20th. Does not breed here.

75. *Dendroica tigrina* Baird. Cape May Warbler. Very rare. Took a single male May 15th, 1863. Has been taken at East Windsor Hill, Conn., by Dr. W. Wood.

76. *Dendroica palmarum* Baird. Yellow Red-poll Warbler. Common in spring from the first or second week of April to the middle of May, frequenting, in company with *D. pinus*, the edges of thickets, orchards, and open fields, and is much on the ground. Is not seen in summer, but becomes common again the last week of September, and is seen throughout October, and sometimes

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the first week of November, remaining the latest of all the Warblers. Is sometimes seen in spring before the snow is gone.

77. *Dendroica discolor* Baird. Prairie Warbler. Usually very rare, but was rather common in May, 1862. Have not known it detected here in summer, though it breeds in other parts of the State. The region is not of the kind they appear partial to, rather preferring rocky barrens, with scattered, dwarfish cedars and pines. Its habits are peculiar, and its notes are very much so.

Of the twenty-two species of *Dendroica* inhabiting the United States, thirteen have been found at Springfield, and one other (*D. cærulea*) may occur as accidental or extremely rare. Four of them (*D. virens*, *pinus*, *pennsylvanica*, *æstiva*) are known to breed here, and two others (*D. Blackburniæ*, *castanea*) have been taken in the breeding season. None are permanent residents, and none are seen in the winter. The remaining five (*D. coronata*, *striata*, *maculosa*, *tigrina*, *palmarum*) are at present known merely as spring and autumn visitants. *D. coronata* is most abundant; *striata* next so; *virens*, *canadensis*, *maculosa*, *æstiva* and *palmarum* are but little less common; *Blackburniæ* is more rare; *castanea* and *discolor* are quite rare, while *tigrina* is extremely rare. The earliest to arrive are *pinus* and *palmarum*, commonly appearing early in April; *striata* is rarely seen before May 30th; the others commonly arrive from May 5th to 12th, and stragglers remain till June. *D. coronata* is decidedly gregarious in its migrations, and is everywhere about equally abundant. The others are usually seen in small parties, and keep pretty closely to the woods, except *D. æstiva* and *palmarum*, *æstiva* being never found in the deep woods.

78. *Wilsonia** *pusilla* Bonap. Black-capped Flycatching Warbler. Rare. Have taken it May 12th to the 18th, and August 23d. Probably breeds. Generally found in swampy thickets.

Probably the Hooded Flycatching Warbler (*Wilsonia mitrata* Bonap.) will yet be found here.

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* The prior use of *Wilsonia* in Botany does not appear to me to be sufficient reason for discarding its use in Ornithology.

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79. *Euthlypis canadensis* Cabanis. (*Myiodioctes canadensis* Aud.) Canada Flycatching Warbler. Common spring and autumn visitant, frequenting all woody situations. Arrives May 12th to 20th, and stragglers are seen till June 3d; returns about the first week of September. Has been found breeding at Lynn, Mass., by George Wells. (Dr. T. M. Brewer, Proc. B. S. N. H., vol. VI., p. 4.)

80. *Setophaga ruticilla* Swain. Redstart. Very common in all wooded places during the greater part of May, and for two or three weeks about September 1st. A very few breed, but the greater part retire to the mountains or northward.

81. *Pyranga rubra* Vieill. Scarlet Tanager. Rather common summer visitant, in high open woods, where it breeds. Occasionally visits open fields, and have known a pair nest in an apple tree, remote from any forest. Arrives about May 15th, and leaves early in September. Gathers its insect food almost wholly among the foliage of the forest trees.

82. *Hirundo horreorum* Barton. Barn Swallow. Very abundant from about May 1st to September 1st. A few usually seen the last week in April; stragglers often seen till the middle of September. One season knew some Barn Swallows to take possession of the nest of a pair of Cliff Swallows, placed as usual under the eaves of a barn, driving off the Cliff Swallows; the next year they built a nest themselves under the eaves, in place of the old one that had fallen down. Have known Barn Swallows to attempt to build in the same place since, but after persistent efforts generally fail, and take to their old quarters inside the barn.

83. *Hirundo lunifrons* Say. Cliff Swallow. "Eave Swallow." About equally common with the preceding; arrives commonly a few days later, and leaves a week earlier. Nests under the eaves of buildings.

84. *Hirundo bicolor* Vieill. White-bellied Swallow. Not very common; apparently least abundant of the Swallows, while in some of the maritime parts of the State it is the most abundant, arriving in numbers the second week in April.

85. *Cotyle riparia* Boie. Bank Swallow. Common,

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arriving about the second week of May; leaves last of August. Arrives the latest, and leaves the earliest, of the Swallows. Breeds in communities.

86. *Progne purpurea* Boie. Purple Martin. Not abundant. Arrives early in May; leaves last of August.

All the Hirundines are gregarious during the latter part of summer, and at other times as much so as the duties of incubation will admit.

87. *Ampelis garrulus* Linn. Bohemian Wax-wing. Winter visitant. Accidental. One was taken a few years since a few miles south of this city.—(East Windsor Hill, Ct.—Dr. W. Wood.)

88. *Ampelis cedrorum* Baird. Cedar Bird. Cherry Bird. "Wax-wing." Abundant during the summer. Is quite irregular and roving in its habits; seen here at nearly all seasons. Seems to be influenced in its wanderings by the supply of food rather than by climate, having observed it in Cambridge in every winter month, where it is often excessively abundant in February and March, feeding on cedar, ash, and hawthorn berries. Are also found in winter along the south side of Mount Holyoke. (C. W. Bennett.) Have observed them often in February and March at Springfield, but they are not common settled visitors till late in May. Seldom begins nesting before the 15th or 20th of June, often laying its first eggs as late as the 25th; have seen the young of the second brood scarcely fledged September 12th. In May they gorge themselves to excess with the petals and stamens of apple blossoms, and generally depend on the smaller fruits for sustenance; they also take many insects, darting from a perch upon them, like the Flycatchers, and towards the end of summer hunt them in the air for half an hour together, pursuing them like the Swallows, but more clumsily, and apparently for amusement rather than from necessity. Gregarious at all seasons, but seen in smaller parties while breeding.

89. *Collyrio borealis* Baird. Great Northern Shrike. Butcher Bird. Regular winter visitant, but not very common. Seen from last of October to middle of April.

90. *Vireo (Vireosylvia) olivaceus* Vieill. Red-eyed Vireo. Abundant, breeding in open woods everywhere, generally fixing its nest to bushes and saplings, four to

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ten or twelve feet from the ground. Arrives about May 5th, and is common till the last week of September. Most abundant of the Vireos; as numerous as all the others together.

91. *Vireo gilvus* Bonap. Warbling Vireo. Common. Arrives first week in May and remains till last week of September. Frequents orchards and gardens, and is very common among the shade trees of the city, but is very rarely seen about woods or thickets. Continues its song throughout the season.

92. *Vireo (Lanivireo) solitarius* Vieill. Solitary Vireo. Quite rare. Probably some breed. Arrives in spring about May 1st. Frequents open woods.

93. *Vireo (Lanivireo) flavifrons* Vieill. Yellow-throated Vireo. Rather common, and breeds. Arrives second week in May. Frequents open woods and the shade trees of the city.

Have never known the White-eyed Vireo *(V. noveboracensis* Bonap.*)* taken here, and if occurring, as it very probably does, being not very uncommon in the eastern parts of the State, must be excessively rare. In above a thousand specimens of the smaller land birds taken at Springfield during the last three years, by different collectors, not a single White-eyed Vireo has been found. *Vireo philadelphicus* Cass. may also occur, having been taken the past season at Waterville, Me., by Prof. C. E. Hamlin. (A. E. Verrill.)

Of the thirteen species of *Vireo* described by Prof. Baird as inhabiting the United States, only three *(V. olivaceus, gilvus, flavifrons)* are at all common here, but one other *(V. solitarius)* occurs, and perhaps two more *(V. noveboracensis* and *philadelphicus)* will yet be detected here. All but *V. philadelphicus*, of the above mentioned, are known to breed within the State. *V. olivaceus* is rarely seen outside the woods, and *gilvus* as rarely elsewhere, while *flavifrons* is common to both situations.

94. *Mimus polyglottus* Boie. Mocking Bird. Very rare. Appears to be its extreme northern limit. Have been known to breed in Springfield several times within five years, and in 1860 two pairs nested here. June 20th, 1860, I found a nest containing three freshly laid eggs,

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incubation not having been begun. Locality, a sandy field growing up to pitch pines, in one of which the nest was placed, about three feet from the ground. The pair was secured, with the nest and eggs.

95. *Galeoscoptes carolinensis* Cab. *(Mimus carolinensis* Gray*)*. Cat Bird. Very abundant, breeding in hedges, thickets and swamps everywhere. Arrives the last week in April; leaves about middle of October.

96. *Harporhynchus rufus* Cab. Brown Thrush. Brown Thrasher. Abundant summer visitant. Breeds in hedges and thickets, occasionally in fields, near woods or thickets. The nest is *very generally* placed *on the ground*; *very rarely* in bushes, one to three feet from the ground. Among *scores* of nests I have seen here, only *three* were placed in bushes, though most authors describe it as always nesting in bushes. But whether the nest is placed on the ground or in bushes may depend upon the nature of the soil, as many birds vary the situation of their nest according to circumstances. Those nests I have observed on the ground have all been in dry and sandy, and consequently warm, localities, favorable for nesting in such a manner; while in some cases where the nest has been found in bushes the ground was cold and wet. Here in the Connecticut Valley the nest is almost universally placed on the ground, and only in a few exceptional cases in bushes.

97. *Troglodytes aedon* Vieill. House Wren. Summer visitant. Not very common. Breeds.

98. *Troglodytes (Anorthura) hyemalis* Vieill. Winter Wren. Rare spring and autumn visitant; occasional in winter. Found in swampy thickets and borders of moist woodlands. A specimen was taken in January, 1863, by Mr. B. Hosford.

All the Wrens are quite rare here, and though I have really detected no others, probably others occur very sparingly, as *Telmatodytes palustris* Cab., and very possibly *Cistothorus stellaris* Cab., and *Troglodytes americanus* Aud. Dr. W. Wood has found the short-billed Marsh Wren *(Cistothorus stellaris)* breeding in the river marshes, at East Windsor Hill, Ct.

99. *Certhia americana* Bonap. Brown Creeper. Common. Resident; but most numerous in winter. Found

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mostly in high open woods, but is also common in the city. Breeds sparingly. Mr. Bradley Hosford showed me a nest of this species, June 2d, 1863, containing young, that apparently had been hatched some four or five days. The nest was in a large elm, in Court Square, Springfield, about ten feet from the ground, and built behind a strip of thick bark that projected in such a way as to leave a protected cavity behind it.

100. *Sitta carolinensis* Gm. White-bellied Nuthatch. Resident. Very common, especially in autumn. Prefers open woods, but frequents orchards in the fall and spring.

101. *Sitta canadensis* Linn. Red-bellied Nuthatch. Winter visitant. Usually common; sometimes very rare. Seen in the woods from the first week in October till the last of April.

The Blue-gray Gnatcatcher *(Polioptila cærulea* Scl.*)* perhaps will be found as a rare summer visitant.

102. *Parus atricapillus* Linn. Chickedee. Black-capped Titmouse. Resident, and abundant at all seasons. Seems to be the only Titmouse yet observed here.

103. *Eremophila cornuta* Boie. Shore Lark. Sky Lark. A few are seen in spring and fall.

104. *Pinicola canadensis* Cab. Pine Grosbeak. Winter visitant. Rare. Occurs in small parties at irregular intervals. Were seen in the winter of 1859—60.

105. *Carpodacus purpureus* Gray. Purple Finch. Chiefly a spring and autumn visitant. But very few breed, and rarely stragglers are met with in the winter. Rather common in April, September and October, but are never so abundant as I have seen them at Cambridge, where, in the spring of 1863, they were the most numerous species of bird for several weeks, occurring in flocks from March 25th to April 20th. Not uncommon in winter on Mount Holyoke. (C. W. Bennett.)

This species seems to have greatly increased in numbers, in the last twenty-five years, in this State, as well as in other of the Eastern States, judging from the accounts of the older naturalists.

106. *Astrigalinus tristis* Cab. *(Chrysomitris tristis* Bonap.*)* Yellow Bird. Goldfinch. Resident. Abundant at all seasons. Breeds very late, often having unfledged

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young September 1st. Is gregarious most of the year, especially in winter, and of roving habits.

107. *Chrysomitris (?) pinus* Bonap. Pine Finch. Regular winter visitant, but not abundant. Arrives first or second week in October, and are seen in small parties till second or third week of May; often frequents orchards in autumn and in May to feed on a species of *Aphis* that infests the appletrees. A nest of this species, found in Cambridge a few years since, is in the Museum of Comparative Zoölogy.

108. *Ægiothus linaria* Cab. Red-poll Linnet. Lesser Redpoll. Irregular winter visitant, occasionally abundant, occurring in very large flocks, as in February and March, 1860, and again are not seen for several years.

109. *Curvirostra americana* Wilson. Common Crossbill. Red Crossbill. An irregular and often very abundant visitor. Though seen here at all seasons I have never been able to find it breeding. But few are generally observed here, but at intervals of several years the pine woods are found in the winter to abound with them, as in the winters of 1853–4, and 1859–60, when in February and March they were in full song; were also abundant in the spring of 1863. Are at all times gregarious, and are sometimes seen in large flocks.

110. *Curvirostra leucoptera* Wilson. White-winged Crossbill. Winter visitant, occurring at irregular intervals in large flocks. Have never seen them later than April 15th. Were very abundant in 1854 and 1860. Are much less frequent visitors than the preceeding.

111. *Plectrophanes nivalis* Meyer. Snow bunting. Regular winter visitant, roving about in flocks, and most numerous in severe weather. Stragglers are sometimes seen the last of October. Mr. C. W. Bennett tells me that a pair spent the summer of 1862, and reared their young, in Springfield.

The Lapland Longspur (*Centrophanes lapponicus* Kaup, *Plectrophanes lapponicus* Selby,) may rarely occur.

112. *Passerculus savanna* Bonap. Savanna Sparrow. Chiefly a spring and autumn visitant. Have never found it breeding. Not common.

113. *Poœcetes gramineus* Baird. Grass Finch. Bay-

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winged Sparrow. Summer visitant, breeding abundantly in open sandy fields and dry pastures. Arrives about April 1st, and remains till the first week in November. Breeds two or three times in a season, first young leaving the nest the last week of May.

114. *Coturniculus passerinus* Bonap. Yellow-winged Sparrow. Abundant summer visitant. Arrives about the first week in May, and leaves in autumn the earliest of the Sparrows, generally about the middle of September. Breeds in dry fields and pastures, raising two broods in the season.

115. *Coturniculus* (?) *Henslowi* Bonap. Henslow's Sparrow. Very rare summer visitant. Took a male May 18th, 1863, and heard another in June. It probably occasionally breeds, as it has been found to do in other parts of the State. (Berlin, Mass.—E. S. Wheeler. Proc. B. S. N. H. VII, p. 137.—Near Lynn, Mass.—E. A. Samuels. Agr. Mass., 1863, Secy's Rep., App. p. XXIV.)

116. *Zonotrichia leucophrys* Swain. White-crowned Sparrow. Rare spring and autumn visitant, possibly breeds here. Have taken it May 22d, and October 1st to 15th 1860; May 7th to June 6th 1861; and May 14th 1863. In 1861 were not very rare in May, and remained latest in spring of all those migratory Finches that do not breed here. Arrives in autumn with the White-throated Sparrow.

117. *Zonotrichia albicollis* Bonap. White-throated Sparrow. Common spring and autumn visitant. Seen in spring from the last week in April till May 20th; in fall from last week in September till the last week in October. Its favorite haunts, while here, are moist thickets, but is found much elsewhere. The males do not attain their mature colors till the second spring. The young males sing equally well with the adults, and probably breed in this plumage. Observing many birds singing in the garb of the female drew my attention to the subject, and dissection showed them invariably to be males. This accounts for the great proportion of birds in the livery of the female, both in spring and fall, often observed.

118. *Junco hyemalis* Sclater. Snow Bird. Spring and autumn visitant; a few are occasionally seen in winter. Arrives from the north about October 1st, and is abundant

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till the last of November; appears in spring early in March; is very abundant till the middle of April, and stragglers are seen till May. Are in full song on their arrival in spring, and at all times are seen in loose flocks. While the snow is passing off in spring they seem to be more numerous than all other birds. Breed among the mountains of Berkshire County, according to Prof. Emmons, and as far south in Hampden County as Blandford and adjoining towns.

119. *Spizella monticola* Baird. Tree Sparrow. Common winter visitant. Seen from October 20th to about May 1st. In winter inhabits sheltered ravines and swamps, and feeds much on the seeds of weeds that remain above the snow in open fields. Are gregarious, and when feeding, particularly in severe weather, keep up a peculiar tinkling twitter. This species was found breeding in the eastern part of the State in the summer of 1855, its nest and eggs being found by Mr. E. Samuels. (Proc. B. S. N. H., vol. v, p. 213.)

120. *Spizella socialis* Bonap. Chipping Sparrow. Very common summer visitant, breeding everywhere in the vicinity of farm-houses, in the city, and even in remote fields, nesting in trees. Arrives about April 1st; leaves second or third week of October. Is not so gregarious while here as its congeners.

121. *Spizella pusilla* Bonap. Field Sparrow. Wood Sparrow. Common summer visitant. Breeds in old bushy fields, nesting *on the ground*. In one or two instances only have I found it nesting in bushes. The males sing the whole summer, and almost constantly from April till July. Arrives about April 1st, collects into loose flocks in August and September, and leaves about the middle of October. In autumn emit tinkling notes, similar to those of *S. monticolor*.

122. *Melospiza melodia* Baird. Song Sparrow. Abundant summer visitant. Breeds about meadows and in moist situations. Arrives the last of March, and is extremely abundant during April, but is not properly gregarious, though occasionally found in considerable flocks when feeding; retires south late in October.

123. *Helospiza Lincolnii* Baird. *(Melospiza Lincolnii*

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Baird.) Lincoln's Sparrow. Very rare. Shot one in May, 1860, and another May 14th, 1863. No account of its previous capture in New England.*

124. *Helospiza palustris* Baird. *(Melospiza palustris* Baird.*)* Swamp Sparrow. Not uncommon in spring and fall, and probably some breed, though I have never taken it later than May 25th. In spring arrives first or second week in April, and appears fully as aquatic as the Water Thrush *(Siurus noveboracensis* Bonap.*)*, associating with it about the margins of ponds and streams, hopping in the shallow water, and is very rarely seen away from watery situations; in autumn is found in bushy marshes and wet places, becoming common about the last week of September, and continuing till the last week of October. Said by Audubon to be abundaant, *in winter*, about Boston.

125. *Passerella illiaca* Swain. Fox-colored Sparrow. Abundant in fall and spring, in small parties, scratching in thickets and moist woods. Arrives in fall October 15th; leaves last of November; appears again early in March, occasionally in February, in open winters, and leaves about April 10th. Often sings finely while here in spring, and sometimes in fall. Audubon was mistaken in saying this species is abundant about Boston, *in summer.*

126. *Guiraca ludoviciana* Swain. Rose-breasted Grosbeak. Summer visitant, breeding in open woods. Not abundant. Arrives May 10th to 15th. One of our most noted woodland songsters, the male occasionally singing while sitting on the nest, both sexes incubating. Nest placed in shrubs and low trees, often in evergreens, six to ten or twelve feet from the ground. Seems to have increased in numbers in the last twenty-five years, in all parts of the State.

127. *Cyanospiza cyanea* Baird. Indigo Bird. Not very common summer visitant. Breeds in bushes, near gardens, orchards, edges of woods, and in bushy meadows. Arrives about the middle of May; leaves middle of September.

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* Since the above was written I have taken another specimen (shot May 25th, 1864.) It was a female, and the largest eggs contained in the ovary were not bigger than a common pin's head.

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128. *Pipilo erythrophthalmus* Vieill. Chewink. Towhe Bunting. Ground Robin. Very abundant summer visitant, breeding in thickets, edges of woods and swamps everywhere, nesting on the ground. Arrives last week in April; leaves second week in October. Somewhat gregarious in autumn.

129. *Dolichonyx oryzivorus* Swain. Bobolink. "Skunk Blackbird." Summer visitant. Arrives about May 10th. Abundant in orchards and meadows. Is scarcely gregarious in the breeding season, though many are usually found nesting in the same meadow, but begin to collect into flocks about the third week in July, at which time the old birds are beginning to moult.

130. *Molothrus pecoris* Swain. Cow Bird. Cow Blackbird. Abundant summer visitant. Polygamous, and more or less gregarious at all seasons. In spring and fall are sometimes seen in flocks of many hundreds, particularly in fall. Arrives first to third week in March, and commonly leaves last week in October. Dr. Brewer was mistaken in saying that the Cow Bird leaves Massachusetts before the first of July, or earlier, &c. (See Aud. Orn. Biog., vol. v, p. 490.)

131. *Agelæus phœniceus* Vieill. Red-winged Blackbird. Marsh Blackbird. Summer visitant, arriving in small parties about the second and third weeks of March. Breeds plentifully, in communities, in the marshes. Rove about the country in considerable flocks during the latter part of the season, and leave the last of October.

132. *Sturnella magna* Swain. Meadow Lark. Common summer visitant. Breeds in meadows and moist pastures. Arrives second or third week in March; leaves about the first week in November; a very few remain in winter. Partially gregarious, especially in autumn.

133. *Icterus Baltimore* Daud. Baltimore Oriole. "Golden Robin". Abundant summer visitant. Breeds plentifully in orchards and shade trees, the elm and the apple being its favorite nesting trees. Arrives about May 10th, and remains till the second week of September. In August and September hunts much in the tall deciduous woods, where it sometimes breeds, feasting, in loose, roving parties of sometimes several dozens, upon the caterpillars

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and beetles that infest the trees, and are then seldom seen in the orchards they so much frequent in the breeding season.

134. *Icterus spurius* Bonap. Orchard Oriole. Rare summer visitant. A few pairs breed every season.

135. *Scolecophagus ferrugineus* Swain. Rusty Grakle. Rusty Blackbird. Rather rare. Stragglers are seen in fall and spring; occasionally small flocks. In spring arrives early, and is seen as late as May; seen in autumn from the last week in September till November; have seen it November 24th.

136. *Quiscalus versicolor* Vieill. Purple Grakle. Crow Blackbird. Common summer visitant, breeding in communities, but is not generally dispersed over the country. Arrives last week in March, and earlier.

137. *Corvus carnivorus* Bartram. American Raven. Accidental. One was taken by Mr. C. W. Bennett, in the fall of 1859. One was killed at Tyngsborough, Mass., a few years since. (Agr. of Mass., 1859, Secy's Rep., p. 143.)

138. *Corvus americanus* Aud. Common Crow. Resident. Very abundant in spring and fall, appearing in immense flocks. Seems to have diminished very materially in numbers in the last six or eight years, hundreds, and probably thousands, having been killed in the State by the use of strychnine almost every year. Fewer have bred here for the last few years than formerly.

139. *Cyanura cristata* Swain. Blue Jay. "Corn Bird." Common resident. Somewhat gregarious. Resides in the woods, but makes frequent excursions over the open country, visiting the orchards for piratical purposes in the summer, and the farmer's corn crib in the winter. In winter have found in its stomach the eggs of the common tent caterpillar in abundance.

140. *Ectopistes migratoria* Swain. Wild Pigeon. Seen in some years in great numbers; in others very rarely; are usually more or less common at all seasons, except winter, and a few generally breed. Lays but one egg at a time, but breeds two or three times in a summer.

141. *Zenœdura carolinensis* Bonap. Carolina Turtle Dove. "Mourning Dove." Very common summer visi-

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tant. Often nests in orchards, and generally in low pine woods. Lays two eggs, and breeds more than once in a season. Arrives second week in March, or earlier; have seen it March 5th. Collects into loose flocks the last of July, frequenting old rye fields, and for two months is abundant, and much hunted by sportsmen, so that at all seasons it is a shy bird. The greater part leave about the 1st of October, but some remain till the second or third week.

142. *Bonasa umbellus* Steph. Ruffed Grouse. "Partridge." Common resident. In autumn many are taken in snares.

143. *Ortyx virginiana* Bonap. Quail. Resident, and now extremely rare. As late as 1851 it was quite abundant, but severe winters and sportsmen have nearly exterminated the species in this vicinity.

144. *Herodias egretta* Gray. White Heron. A single specimen was taken a few years since. There is a fine specimen of this species in the Springfield Museum, taken in West Brookfield, Mass., in 1860.

145. *Ardea herodias* Linn. Great Blue Heron. "Blue Crane." Regular summer visitant, breeding. Not common. Arrives early in April.

146. *Ardetta exilis* Gray. Least Bittern. Extremely rare. Has been taken here. (C. W. Bennett.) Have seen specimens taken in other parts of the State.

147. *Botaurus lentiginosus* Steph. Bittern. "Stake-driver." Common in the marshes and river meadows. Arrives first week in April; remains till second week of October, or later.

148. *Butorides virescens* Bonap. Green Heron. "Shitepoke." Common. Breeds plentifully in trees in the vicinity of marshes.

149. *Nyctiardea Gardeni* Baird. Night Heron. "Squawk." Common. Arrives about the middle of April. In August have seen several dozens in the air at once, near their feeding grounds, soon after sunset. Are gregarious and breed in communities. Says Dr. Wood, in a letter to the writer, "I know of a swamp some fourteen miles from here [East Windsor Hill, Ct.] where *thousands* breed. I have counted eight nests on one maple tree.

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I knew two sportsmen shoot a business wagon body full one forenoon—probably two hundred."

150. *Charadrius virginicus* Borck. Golden Plover. Spring and autumn visitant. Not Common, except occasionally.

151. *Oxyechus vociferus* Reich. (*Ægialitis vociferus* Cass.) Killdeer Plover. Summer visitant, and breeds. Common only in particular localities.

152. *Ægialeus semipalmatus* Reich. (*Ægialitis semipalmatus* Cab.) Semipalmated Plover. Spring and autumn visitant. Not rare.

153. *Philohela minor* Gray. Woodcock. Common summer visitant, arriving early in April. Breeds.

154. *Gallinago Wilsonii* Bonap. Wilson's Snipe. Spring and autumn visitor; sometimes abundant. Probably a few breed.

155. *Pelidna americana* Coues. (*Tringa alpina* var. *americana* Cass.) Red-backed Sandpiper. Spring and autumn visitor; not generally common.

156. *Actodromas maculata* Cass. (*Tringa maculata* Vieill.) Jack Snipe. Occasionally taken in autumn.

157. *Actodromas minutilla* Coues. (*Tringa Wilsonii* Nutt.) Least Sandpiper. Occasionally taken towards autumn; probably occurs also in spring. Bonaparte's Sandpiper (*Actodromas Bonapartii* Cass.) is undoubtedly to be found here occasionally in autumn.

158. *Symphemia semipalmata* Hart. Willet. Spring and autumn visitant. Not common. Perhaps a few occasionally breed.

159. *Gambetta melanoleuca* Bon. Greater Tell-tale Tatler. Rare spring and autumn visitant; less common than the next.

160. *Gambetta flavipes* Bon. Lesser Tell-tale Tatler. "Yellow Legs." Spring and autumn visitant. Not uncommon.

161. *Rhyacophilus solitarius* Wils. Solitary Tatler. Spring and autumn visitant; not usually common.

162. *Tringoides macularius* Gray. Spotted Sandpiper. Summer visitant, breeding abundantly. Most common of the *Grallæ*.

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163. *Bartramia laticauda* Less. *(Actiturus Bartramius* Bonap.*)* Field Plover. Bartram's Sandpiper. Summer visitant; breeds, and towards autumn is often very common.

164. *Tringites rufescens* Cab. Buff-breasted Sandpiper. Rare spring and autumn visitant.

165. *Rallus virginianus* Linn. Virginia Rail. "Water Hen". Not common. Occasionally breeds here; a pair of young in the Springfield Museum taken here.

166. *Porzana carolina* Vieill. Common Rail. Sora Rail. Arrives in April, and some remain till November. Breeds, and is pretty common in September and October. The Yellow Rail (*P. noveboracensis*), being found in other parts of the State, may be looked for here, but only as a rare species.

167. *Fulica americana* Gm. Coot. Occasionally taken. Dr. W. Wood says: "I have taken five in a season. They come after most ducks have gone north, and resort to the small and inland ponds." Breed in some parts of Massachusetts.

168. *Bernicla canadensis* Boie. Canada Goose. "Wild Goose." Common spring and autumn visitant, but seldom seen except flying in the air. Pass to the north in March and April, and to the south in November. Have seen flocks as early as September 28th, and as late as December 10th. Were unusually abundant in the fall of 1859. November 19th, 1859, between the hours of 10 A. M. and 12 M., I noted *ten* flocks in a breadth of two miles, estimated (more than half being actually counted) to contain more than seven hundred geese, a remarkably large number for the length of time Probably does not breed in the State, though supposed to by Audubon.

169. *Bernicla brenta* Steph. Brant. Not common; seen at the same seasons as the preceding.

170. *Anas boschas* Linn. Mallard. Taken near here by Dr. Wood, and undoubtedly occurs here, but is very rare, as it is in all parts of the State.

171. *Anas obscura* Gm. Black Duck. Abundant. Arrives in March and remains till May; becomes common again in September and remains till late in November; a few sometimes seen in winter. Our most common Duck. Breeds in the mountainous parts of Western Massachusetts.

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172. *Dafila acuta* Jenyns. Pin-tail Duck. "Sprig Tail." Rather rare winter visitant.

173. *Nettion carolinensis* Baird. Green-winged Teal. Common. Dr. W. Wood tells me they pass north later and return earlier than most Ducks.

174. *Querquedula discors* Steph. Blue-winged Teal. Common, but less abundant than the preceding.

175. *Chaulelasmus streperus* Gray. Gadwall. Gray Duck. Rare. Specimen in Springfield Museum taken here. Said to breed in the State, but the authority is doubtful.

176. *Mareca americana* Steph. American Widgeon. Bald-pate. Not very common, in spring and fall.

177. *Aix sponsa* Boie. Wood Duck. Summer Duck. Not an uncommon summer visitant, breeding. Arrives early in spring, and leaves late in November.

178. *Aythya vallisneria* Bon. Canvass-Back Duck. Very rare; found occasionally near here (Dr. Wood), and undoubtedly is to be found here. Occurs in other parts of the State. Probably the Red-head *(A. americana* Bon.*)* is also to be found here.

179. *Bucephala americana* Baird. Golden-eye Duck. "Whistler." "Whistle-wing." Not uncommon in winter. Dr. Wood, says it is abundant on the river in winter, but very difficult to obtain unless you are pretty familiar with its feeding grounds.

180. *Bucephala albeola* Baird. Buffel-headed Duck. "Butter Ball." Occasionally taken here in winter.

181. *Harelda glacialis* Leach. Long-tailed Duck. "South Southerly." Occasionally taken near here (Dr. Wood), and undoubtedly occurs at Springfield.

182. *Melanetta velvetina* Baird. Velvet Duck. Rare. Dr. Wood has taken two specimens at East Windsor Hill, Ct., and it must occur here.

183. *Erismatura rubida* Bon. Ruddy Duck. Rare; there is a specimen in the Springfield Museum taken here by Mr. L. Hyde.

184. *Mergus americanus* Cass. Sheldrake. Goosander. Common winter visitant. Said by Audubon to breed in the State, which is not improbable.

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185. *Mergus serrator* Linn. Red-breasted Merganser. Common winter visitant; rather more common than the preceding. Breeds in the State, according to Audubon. (Orn. Biog., vol. v, p. 93.)

186. *Lophodytes cucullatus* Reich. Hooded Merganser. Winter visitant; rather less common than either of the two immediately preceding.

187. *Thalassidroma Leachii* Temm. Leach's Petrel. Very rare; probably accidental; has been taken here in a few instances only. Common off the coast of the State.

188. *Larus Smithsonianus* Coues. *(Larus argentatus* Brünn.*)* Herring Gull. Not very uncommon at times along the river, especially in spring and fall. Abundant along our coast in autumn, winter, and early spring.

189. *Chrœcocephalus Philadelphia* Lawr. Bonaparte's Gull. Occasionally observed here. Common along the coast.

190. *Colymbus torquatus* Brünn. Great Northern Diver. "Loon." Resident, occasionally breeding. Not common.

191. *Colymbus septentrionalis* Linn. Red-throated Diver. Rare winter visitant; chiefly young that are seen

192 *Podiceps (Pedœthya) Holbolli* Reinh. *(Podiceps griseigena* Gray.*)* Red-necked Grebe. Chiefly a winter visitant; not common. Possibly breeds, as it has been taken here the third week of May in full breeding plumage

193. *Podiceps cristatus* Lath. Crested Grebe. Rare winter visitant.

194. *Podiceps (Dytes) cornutus* Lath. Horned Grebe. Rare; chiefly young taken here. A pair was killed here a few years since, about June 1st, in full breeding plumage.

195. *Podilymbus podiceps* Lawr. "Dipper Duck." Common in spring and fall.

List of Birds found in Massachusetts not observed at Springfield.

To complete a catalogue of the Birds known to exist in the State of Massachusetts, I have added, in the following list, all those known to have been obtained within the

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State that have not been noticed at Springfield. The list will be seen to consist mainly of those Water Birds that frequent the coast and are not found far inland, with a few rare or accidental visitors. No species is admitted of which there is not good evidence of its capture in the State; and when the species is extremely rare, the authority is cited on which it is inserted. Consequently some species that have been attributed to Massachusetts, from their occurrence in adjoining States, though probably to be found here as rare visitors, and are thus mentioned, are not counted as a part of the list; very careful observers will, doubtless, yet detect most of them here.

1. *Cathartes atratus* Less. Black Vulture. Accidental. One was obtained in Swampscott, in November, 1850. (S. Jillson, Proc. Ess. Inst., Vol. I, p. 223 —Brewer's N. Am. Oölogy, pt. I, p. 5.) Another was taken the past season, Sept. 28, at Gloucester, by Mr. William Huntsford. (A. E. Verrill.)

2. *Cathartes aura* Ill. Turkey Vulture. Accidental. Two were taken in the State in 1863. (E. A. Samuels, Agr. Mass., 1863, Secy's Rep, App, p. XVIII.)

3. *Falco candicans* Gm. Jer Falcon. Accidental in winter. One was shot at Sekonk Plains, about 1840. (S. Jillson, Proc. Ess. Inst., vol. I, p. 226.) Has been seen here by Nuttall and others.

4. *Aquila canadensis* Cass. Golden Eagle. Extremely rare; but few recorded instances of its capture in the State. (Lynn, S. Jillson, Proc. Ess. Inst., vol. I, p. 203. Lexington, Dr. Kneeland, Proc. B. S. N. H., vol. V, p. 272. Near Boston, Brewer, N. Am. Oöl,. pt. I, p. 45.—Upton, Agr. Mass., 1859, Secy's Rep., p. 141.)

5. *Syrnium cinereum* Gmelin. Great Cinerous Owl. Occasional in winter. (Marblehead, February, 1831, and January, 1835; S. Jillson, Proc. Ess. Inst., vol. I, p. 204.) Seven were taken in the State during the year ending February, 1843. (Dr. S. L. Abbot, Proc. B. S. N. H., vol. I, pp. 57 and 99.) Two specimens in the Mus. Comp. Zoölogy were obtained in 1848, in the Boston markets, and were *probably* killed in the State.

The Hawk Owl *(Surnia ulula* Bon.*)* is said by Prof. Emmons to have been seen in autumn. Though I have

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found no notice of its capture, it is not improbable that it may occasionally occur along the Green Mountains in the Western part of the State.

The Banded Three-toed Woodpecker (*Picoides hirsutus* Gray) has been repeatedly attributed to the State, and may occur as a very rare or accidental winter visitor.

6. *Hylotomus pileatus* Baird. Pileated Woodpecker. "Log Cock." Rare. Driven from most parts of the State by the absence of extensive forests, but is still found in the wooded, mountainous parts of Berkshire County.

The Varied Thrush (*Ixoreus nævius* Bon.) is said by Prof. Baird, in the Reports on the Pacific Railroad Explorations and Surveys, vol. IX, pp. XXI and 219, to be accidental near Boston, quoting Dr. Cabot (Proc. Bost. So. N. H., vol. III, p. 17) as authority. Dr. Cabot states that a specimen of this species was obtained in *Boston market*, but adds that it was *shot in New Jersey*. This is the only notice I can find respecting this species being found in Massachusetts, either by Dr. Cabot or others.

7. *Oporornis agilis* Baird. Connecticut Warbler. Very rare. Was taken in Berlin, in the summer of 1845. (Dr. S. Cabot Jr., Proc. Bost. So. N. H., Vol. II, p. 63.)

8. *Helmitherus vermivorus* Bon. Worm-eating Warbler. Very rare. Its nest has been found in Cambridge. (Peabody's Rep. Orn. of Mass., p. 312.*)

9. *Helmitherus Swainsonii* Bon. Swainson's Warbler. Audubon states, on the authority of Dr. T. M. Brewer, that one was taken in Massachusetts by Mr. S. Cabot Jr. (Aud. Orn. Biog., vol. V, p. 462.) Mr. Peabody probably alludes to the same specimen (Rep. on Orn. of Mass., p. 213.) Very rare in this State.

10. *Helminthophaga pinus* Baird. Blue-winged Yellow Warbler. Summer visitant. Very rare. (S. Cabot Jr., Proc. B. S. N. H., vol. VI, p. 386.)

11. *Helminthophaga chrysoptera* Baird. Golden-winged Warbler. Summer visitant. Very rare. (S. Cabot Jr., Proc. B. S. N. H., vol. VI, p. 386.) Have seen specimens in the Mus. Comp. Zoöl., Cambridge, that were taken in the State.

* Fishes, Reptiles and Birds of Massachusetts.

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The Blue Warbler *(Dendroica cærulea* Baird.*)* is said to be a rare summer visitant, (F. W. Putnam, Proc. Ess. Inst., vol. I, p. 207,) but I have failed to find an authentic instance of its capture in this State. Audubon says it has been taken at Pictou, Nova Scotia, and so may very naturally be expected to occur in Massachusetts.

12. *Wilsonia minuta* Bon. *(Myioioctes minutus* Baird.) Small-headed Flycatcher. This little known and rather doubtful species is said to occur in this State. (Ipswich, Dr. T. M. Brewer; Berkshire County, Prof. E. Emmons. Peab. Rep. Orn. Mass., p. 297.—Salem, T. Nuttall, Man. Orn., vol. I, p. 297.)

The Hooded Flycatcher *(Wilsonia mitrata* Bon.; *Myiodiœtes mitratus* Aud.) may be looked for in this State, as it has been found in Connecticut and New York. Mr. E. A. Samuels, in his recent list of the Birds of Massachusetts, (Agr Mass., 1863, Secy's Rep., App., p. XXII,) gives it as a rare summer visitor.

13. *Pyranga æstiva* Vieill. Accidental. "Two were taken in Lynn, after a severe storm, April 21st, 1852." (S. Jillson, Proc. Ess. Inst., vol. I, p. 224.)

14. *Vireo noveboracensis* Bon. White-eyed Vireo. Summer visitant. Not very uncommon in the eastern part of the State, where it breeds.

15. *Cistothorus (Telmatodytes) palustris* Cabanis. Marsh Wren. Summer visitant. Rare.

16. *Cistothorus stellaris* Cab. Short-billed Marsh Wren. Summer visitant. Not uncommon.

The Blue Gray Gnatcatcher *(Polioptila cærulea* Sclat.*)* is said by Peabody to be found in Massachusetts, on the authority of Dr. Brewer, (Rep., p. 297.) Having been found in adjoining States,—in New York north of the latitude of Boston, as well as in Nova Scotia, and in Connecticut,—it may be looked for as a rare straggler from its usual habitat. I have been unable as yet to learn of its actual capture in this State.

The Crested Chickadee *(Lophophanes bicolor* Bonap.*)* though mostly a southern species, Audubon states (Orn. Biog., vol. V, p. 472) is common in Nova Scotia, and hence may be expected to occur here.

17. *Parus hudsonicus* Forster. Hudsonian Titmouse.

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Occasional or accidental in winter. (Brookline, S. Elliot Green, Peabody's Rep., p. 402.) Resident at Calais, Maine, but not common. (G. A. Boardman, Proc. B. S. N. H., vol. IX, p. 126.)

18. *Centrophanes lapponicus* Kaup. Lapland Longspur. Winter visitant. Occasional, or accidental. (F. W. Putnam, Proc. Ess. Inst., vol. I, p. 210.)

19. *Ammodromus maritimus* Swain. Sea-side Finch. Summer visitant. Common in the salt marshes along the coast, where it breeds.

20. *Ammodromus caudacutus* Swain. Sharp-tailed Finch. Common summer visitant in salt marshes, where it breeds. Have taken it in the marshes of Charles River the last week in October.

21 *Chondestes grammaca* Bon. Lark Finch. Accidental. "One found in Gloucester, about 1845." (S Jillson, Proc. Essex Inst., vol. I, p. 224.)

22. *Euspiza americana* Bon. Black-throated Bunting. Probably rare or occasional. Said to be found here by Nuttall (Man. Orn., vol. I, p. 461). According to Peabody, "is found in high meadows near salt water marshes, from the middle of May till the last of August." (Rep. Orn. of Mass., p. 319.) Mr. E. A. Samuels informs me that he has seen two specimens killed in this State; one was sent him from Woburn. Nuttall, in his account of the notes and habits of this species, as observed here, has described the peculiar song and habits of the Yellow-winged Sparrow (*Coturniculus passerinus* Bon.) with remarkable aptness, which species he evidently mistook for the Black-throated Bunting. Nuttall seems not to have known the Yellow-winged Sparrow, under its proper name, at the time he wrote, and it is difficult to tell what he had in mind when describing its habits and distribution in the breeding season; his description of its song, which he strangely likens to that of the Purple Finch, and of its eggs, being not at all applicable to the Yellow-winged Sparrow. As Nuttall has been the authority chiefly depended on for the occurrence of *Euspiza americana* in this State, I strongly doubted its having been taken here, till assured of the fact by Mr. Samuels.

The Blue Grosbeak (*Guiraca cærulea* Swain.) may be

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looked for as an occasional visitor. Has been found at Calais, Maine, where it is "very uncertain, but common in the spring of 1861." (G. A. Boardman, Proc. B. S. N. H., vol. IX, p. 127.)

23. *Cardinalis virginianus* Bon. Cardinal. Red Bird. Accidental summer visitant, according to Nuttall. (Man. Orn., vol. I, p. 519.) Seen "only at irregular intervals, in the villages on the Connecticut river." (Peabody, Rep. Orn. Mass., p. 329.)

24. *Quiscalus major* Vieill. Boat-tailed Grakle. Accidental. Have heard of one that was killed in Cambridge a few years since. Mr. E A. Samuels tells me that a pair bred in Cambridge in 1861.

25. *Corvus ossifragus* Wils. Fish Crow. An occasional visitor along the southern coast of the State.

26. *Tetrao canadensis* Linn. Spruce Partridge. Accidental. Found in the hemlock woods of Gloucester, in September, 1851. (S. Jillson, Proc. Ess. Inst., vol. I, p. 224.)

27. *Cupidonia cupido* Baird. Pinnated Grouse. Prairie Hen. Nearly extinct in Massachusetts. A few are occasional visitors in the southeastern part of the State, from Long Island, where they still remain. (S. Cabot Jr., Proc. B. S. N. H., vol. V, p. 154.) About thirty years since were quite common in Martha's Vineyard (Audubon Birds Amer., vol. V, p. 101.)

The Wild Turkey *(Meleagris gallopavo* Linn.*)* is now probably extinct in this State. Within a few years it has been said to occur wild on Mts. Tom and Holyoke; but I can find no authentic instance of its recent capture in this State. The accounts of those recently taken seem to rest on the authority of hunters, who might readily mistake a stray domestic turkey for a wild one, and not on the authority of reliable naturalists. It is well known that the domestic turkey will sometimes take to the woods, assuming the habits of the wild bird; hence these reports may well be received with considerable caution. In winter the wild birds are found in Boston markets, but are brought from distant parts of the country, chiefly from the West.

28. *Garzetta candidissima* Bonap. Snowy Heron. Ac-

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cidental. Stragglers have been taken in a few instances. Have seen one that was killed near Boston, in 1862.

29. *Florida cœrulea* Baird. Blue Heron. Stragglers only taken here. There is a specimen in the State Agricultural Cabinet, taken in the eastern part of the State.

30. *Ibis Ordii* Bonap. Glossy Ibis. Occasional; apparently accidental. Have been taken here at irregular intervals. In June, 1830, three were obtained in the eastern part of the State. (Nuttall, Man. Orn., vol. II, p. 88.) Others have been taken. (Cabot, Proc. B. S. N. H., vol. III, pp. 313, 333, 355; vol. IV, p. 346.)

31. *Octhodromus Wilsonius* Reich. (*Ægialitis Wilsonius* Cass.) Wilson's Plover. Occasional in summer. Inserted on the authority of Dr. Brewer, who found them, according to Peabody (Rep. Orn. Mass. p. 360), "abundant at Nahant, in August," 1838.

32. *Ægialeus melodus.* (*Ægialitis melodus* Cab.) Piping Plover. Common visitant, mostly along the seacoast in summer, some breeding.

33. *Hœmatopus palliatus* Temn. Oyster Catcher. Very rare. Has been found in the State by Dr. Brewer. (Peab. Rep. Orn. Mass., p. 358.)

34. *Strepsilas interpres* Ill. Turnstone. Common spring and autumn visitant, along the coast.

The American Avoset (*Recurvirostra americana* Gmel.) and the Black-necked Stilt (*Himantopus nigricollis* Vieill.), from their general distribution, may be looked for in Massachusetts as very rare species.

35. *Phalaropus Wilsonii* Sab. Wilson's Phalarope. Very rare. Found in the State by Audubon. (Birds Am., vol. V, p. 301.)

36. *Phalaropus hyperboreus* Temn. Northern Phalarope. Along the coast; not common.

37. *Phalaropus fulicarius* Bon. Red Phalarope. Occasional visitor, chiefly along the coast, in spring and autumn.

38. *Macrorhamphus griseus* Leach. Red-breasted Snipe. Not very common. Spring and autumn visitant, near the coast.

39. *Tringa canutus* Linn. Ash-colored Sandpiper.

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Knot. "Gray Back." Spring and fall; sometimes very abundant in autumn, arriving in August.

40. *Arquatella maritima* Baird. (*Tringa maritima* Brünn.) Purple Sandpiper. "Rock Snipe." On the coast in autumn; not generally common.

41. *Ancylochilus subarquata* Kaup. Curlew Sandpiper. Coast; not common.

42. *Actodromas Bonapartii* Cass. (*Tringa Bonapartii* Schl.) Bonaparte's Sandpiper. Coast in spring and fall; sometimes abundant.

43. *Ereunetes pusilla* Cass. Semipalmated Sandpiper. Common along the coast in spring and autumn.

44. *Limosa fedoa* Ord. Marbled Godwit. Rare passenger in spring and fall.

45. *Limosa hudsonica* Swain. Hudsonian Godwit. Spring and fall. Not common.

46. *Numenius longirostris* Wilson. Long-billed Curlew. Spring and fall. Not common.

47. *Numenius hudsonius* Lath. Hudsonian Curlew Rare. Spring, fall and winter.

48. *Numenius borealis* Lath. Esquimaux Curlew. Spring and fall; occasionally in winter on the coast. Rare.

49. *Rallus crepitans* Gm. Clapper Rail. Rare or accidental. (S. Cabot Jr., Bost. So. N. H., vol. III, p. 326.)

50. *Porzana noveboracensis* —? Yellow Rail. Found in spring and fall; perhaps breeds. Not common.

51. *Gallinula galeata* Bonap. Florida Gallinule. Accidental. Has been taken at Fresh Pond, Cambridge, by Mr. Cabot. (Peab. Rep. Orn. Mass., p. 258.)

52. *Gallinula martinica* Lath. Purple Gallinule. Like the preceding, occurs as a very rare, chance visitor from the south, but is oftener met with. Has been taken but a few times in this State.

53. *Anser hyperboreus* Pallas. Snow Goose. Winter visitant. Not common.

54. *Anser Gambellii* Hartl. White-fronted Goose. Have seen specimens obtained in Boston market that were probably taken in the State.

55. *Bernicla Hutchinsii* Bonap. Hutchin's Goose.

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This species is introduced as a bird of Massachusetts with considerable doubt. For its occurrence here, we have the authority of Nuttall, (Man. Orn., vol. II, p. 362) who mentions it as a straggler on our coast,—and of Giraud, who says it is quite abundant some seasons on the coast of Massachusetts. Lindsley, in his Catalogue of the Birds of Connecticut, (Am. Jour. Sc. and Arts, vol. XLIV, p. 249) says it is not unfrequently taken in Connecticut in spring.

56. *Bernicla leucopsis* —? *(Anser erythropus* Linn.) Barnacle Goose. Is said to have been shot at Quincy, Mass., by Dr. S. Cabot Jr., (Proc. B. S. N. H., vol. III, p. 136.) Prof. Baird says, "its occurrence in North America is very doubtful, resting only on very insufficient evidence. (P. R. R. Ex. and Surv., vol. IX, p. 768.)

57. *Nettion crecca* Kaup. English Teal. Accidental from Europe. Has been taken in the State. (Dr. H. Bryant, Proc. B. S. N. H., vol V, p. 195.)

58. *Spatula clypeata* Boie. Spoonbill. Shoveller. Not uncommon. Chiefly seen in spring and fall.

59. *Mareca penelope* Bon. European Widgeon. Has been taken at several points along the eastern coast of the United States, and has been found apparently breeding on Long Island, (Dr. T. M. Brewer, Proc. B. S. N. H , vol. VI, p. 419) where it has been repeatedly found. One has been taken in this State. (E. A. Samuels.)

60. *Fulix marila* Baird. Scaup Duck. Black-headed Duck. "Blue Bill." Not common. Found chiefly in spring and autumn; occasionally in winter.

61. *Fulix affinis* Baird. Little Black-headed Duck. Spring and fall. Not common.

62. *Fulix collaris* Baird. Ring-necked Duck. Spring and autumn. Rare.

63. *Aythya americana* Bon. Red-headed Duck. "Redhead." Autumn and winter. Not very common. Abundant in the markets of Boston in winter, but, like the Canvassbacks, are brought from the bays and rivers of the Middle States.

64. *Histrionicus torquatus* Bonap. Harlequin Duck. Winter visitant. Not common.

65. *Camptolæmus labradorius* Gray. Labrador Duck. Rare winter visitant.

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66. *Pelionetta perspicillata* Kaup. Surf Duck. Common in fall and spring, and some remain through the winter.

67. *Oidemia americana* Swain. Scoter. Autumn and winter. Not uncommon; often abundant.

68. *Somateria mollissima* Leach. Eider Duck. Not uncommon in winter.

69. *Somateria spectabilis* Leach. King Eider. Rare visitant in winter.

The Smew *(Mergellus albellus* Selby) Mr. E. A. Samuels attributes to this State, having seen a specimen which he was told was taken in Massachusetts Bay.

The American Pelican *(Pelecanus erythrorhyncus* Gmelin*)* has recently been taken at Calais, Me., (G. A. Boardman, Proc. B. S. N. H., vol. IX, p. 130) and, according to DeKay, was formerly numerous on the Hudson and other rivers and lakes of New York. It probably occurs as a chance visitor in this State.

70. *Sula bassana* Ross. Gannet. Occasional on the sea coast in fall and winter.

71. *Graculus carbo* Gray. Common Cormorant. "Shag." Common near the coast in fall and winter.

72. *Graculus dilophus* Gray. Double-crested Cormorant. Not uncommon near the coast in winter.

73. *Procellaria glacialis* Linn. Fulmar Petrel. Spring and autumn visitant.

74. *Thalassidroma Wilsonii* Bon. Wilson's Petrel. Not uncommon off the coast. Have seen specimens taken near Chelsea Beach.

75. *Thalassidroma pelagica* Bon. Mother Cary's Chicken. Rare, off the coast, as far south as Provincetown. (E. A. Samuels.)

76. *Puffinus major* Bon. Greater Shearwater. Not common. Off the coast in winter.

77. *Puffinus fuliginosus* Strick. Sooty Shearwater. Coast in autumn and winter. Not common.

78. *Puffinus anglorum* Temn. Mank's Shearwater. Rare, off the coast in winter.

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79. *Stercorarius pomarinus* Temn. Pomarine Jager. Massachusetts Bay. Rare in winter.

80. *Stercorarius parasiticus* Temn. Arctic Jager. Massachusetts Bay in winter. Not common.

81. *Stercorarius cepphus* Lawr. Buffon's Skau. Rare. Has been taken near Boston.

82. *Larus marinus* Linn. Black-backed Gull. Not a common winter visitant.

83. *Larus delawarensis* Ord. Ring-billed Gull. Not very uncommon near the coast in winter.

84. *Larus leucopterus* Fabr. White-winged Gull. Rare winter visitant.

85. *Chrœcocephalus atricilla* Lawr. Laughing Gull. Winter. Not common.

86. *Rissa tridactyla* Bon. Kittiwake Gull. Very common about the islands in Massachusetts Bay in autumn and winter.

The Fork-tailed Gull *(Xema Sabinii* Bonap.*)* may occur on our coast as an occasional visitor.

87. *Sterna aranea* Wils. Marsh Tern. Rare summer visitor. (E. A. Samuels, Agr. Mass. 1863, Sec's Rep. App., p. xxix.)

88. *Sterna fuliginosa Gm.* Sooty Tern. Rare summer visitor. (E. A. Samuels, Agr. Mass., 1863, Secy's Rep., App., p. xxix.) Mr. Samuels informs me that it breeds on Muskegat Island, near Martha's Vineyard.

89. *Sterna hirundo* Linn. Wilson's Tern. Common in summer, breeding on the rocky islands in the Bay.

90. *Sterna macroura* Naum. Arctic Tern. Common. Chiefly a winter visitant. Sometimes breeds.

91. *Sterna paradisea* Brünn. Roseate Tern. Very rare; perhaps merely accidental; from the south in summer. Several instances known of its capture in the State. (Chelsea Beach, Nuttall, Man. Orn. vol. II, p. 278.—Beverly, Mass., 1847, S. Cabot Jr., Proc. B. S. N. H. vol. II, p. 248.—Have seen a specimen taken off our coast a few years since.

92. *Sterna frenata* Gambel. Least Tern. Spring and

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autumn visitant. Not common. Occasional in summer.

Other species of *Sterna* undoubtedly occur as rare visitors off our coast, as the Caspian Tern (*Sterna caspia* Pall.) in winter, from the north; and possibly, at the same season, Trudeau's Tern (*Sterna Trudeauii* Aud.) as a very rare, or accidental species.

93. *Hydrochelidon fissipes* Gray. (*Hydrochelidon plumbea* Wils.) Short-tailed Tern. Not common. Have seen specimens taken near Chelsea Beach.

94. *Colymbus arcticus* Linn. Black-throated Diver. rare autumn and winter visitor.

95. *Utamania torda* Leach. Razor-billed Auk. Not uncommon on the coast in autumn and winter.

96. *Mormon arctica* Ill. Arctic Puffin. Not uncommon in winter.

97. *Uria grylle* Lath. Black Guillemot. Not very uncommon winter visitant.

98. *Cataractes troile* Bryant. Foolish Guillemot. Murre. Not uncommon in winter, and perhaps a few breed.

99. *Cataractes ringvia* Bryant. Murre. Common in winter.

100. *Cataractes lomvia* Bryant. (*Uria arra* Pall.) Thick-billed Guillemot. Murre. Rather common in winter.

101. *Mergulus alle* Vieill. Little Auk. Sea Dove. Rather rare winter visitant. Has been taken on the Connecticut, at Greenfield, Mass., in one instance.

The birds found in Massachusetts may be conveniently grouped into the following classes: I. Species that regularly breed in the State. II. Resident species. III. Winter visitants. IV. Spring and autumn visitants. V. Summer visitants. VI. Accidental or irregular visitants.

I. *Species that regularly breed in the State.*

Those marked with a star, though repeatedly found breeding in some localities, breed very sparingly, and not generally over the State. Some others are common in some parts of the State, but are unknown or very rare

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in most parts. Several others have been known to breed, but apparently only accidentally, as in the case of *Chrysomitris pinus*, *Spizella monticola*, and a few others. A few not in the list may occasionally breed.

1. Falco anatum *Bonap.**
2. Tinnunculus sparverius *Vieill.**
3. Accipiter Cooperii *Bonap.*
4. " fuscus *Bonap.*
5. Buteo borealis *Vieill.*
6. " lineatus *Jard.*
7. " pennsylvanicus *Bon.*
8. Circus hudsonius *Vieill.*
9. Haliætus leucocephalus *Sav.**
10. Pandion carolinensis *Bon.**
11. Bubo virginianus *Bonap.*
12. Scops asio *Bonap.*
13. Otus americanus *Bonap.*
14. Brachyotus Cassinii *Brewer.*
15. Syrnium nebulosum *Gray.*
16. Nyctale acadica *Bonap.*
17. Coccygus americanus *Bon.*
18. " erythrophthalmus *Bon.*
19. Picus villosus *Linn.*
20. " pubescens *Linn.*
21. Sphyropicus varius *Baird.*
22. Hylotomus pileatus *Baird.**
23. Melanerpes erythrocephalus *Sw.**
24. Colaptes auratus *Swain.*
25. Trochilus colubris *Linn.*
26. Chætura pelasgia *Steph.*
27. Antrostomus vociferus *Bon.*
28. Chordeiles popetue *Baird.*
29. Ceryle alcyon *Boie.*
30. Tyrannus carolinensis *Bd.*
31. Myiarchus crinitus *Cab.**
32. Sayornis fuscus *Baird.*
33. Contopus borealis *Baird.*
34. " virens *Cab.*
35. Empidonax Traillii *Baird.*
36. " minimus *Bd.*
37. " acadicus *Bd.*
38. Turdus mustelinus *Gmelin.*
39. " Pallasii *Cabanis.**
40. " fuscescens *Steph.*
41. " migratorius *Linn.*
42. Sialia sialis *Baird.*
43. Mniotilta varia *Vieill.*
44. Parula americana *Bon.*
45. Geothlypis trichas *Cab.*
46. Icteria viridis *Bon.**
47. Helmitherus vermivorus *Bon.**
48. Helminthophaga ruficapilla *Bd.*
49. Siurus aurocapillus *Swain.*
50. " noveboracensis *Nutt.*
51. Dendroica virens *Baird.*
52. Dendroica canadensis *Bd.**
53. " Blackburniæ *Bd.*
54. " pinus *Baird.*
55. " æstiva *Bd.*
56. " discolor *Bd.*
57. Euthlypis canadensis *Cab.**
58. Setophaga ruticilla *Sw.*
59. Pyranga rubra *Vieill.*
60. Hirundo horreorum *Barton*
61. " lunifrons *Say.*
62. " bicolor *Vieill.*
63. Cotyle riparia *Boie.*
64. Progne purpurea *Boie.*
65. Ampelis cedrorum *Baird.*
66. Vireo olivaceus *Vieillot.*
67. " gilvus *Bonap.*
68. " noveboracensis *Bon.*
69. " flavifrons *Vieill.*
70. Mimus polyglottus *Boie.**
71. Galeoscoptes carolinensis *Cab.*
72. Harporynchus rufus *Cabanis.*
73. Cistothorus palustris *Cab.*
74. " stellaris *Cab.*
75. Troglodytes ædon *Vieill.*
76. Certhia americana *Bon.*
77. Sitta carolinensis *Gmel.*
78. Parus atricapillus *Linn.*
79. Carpodacus purpureus *Gray.*
80. Astrigalinus tristis *Cabanis.*
81. Passerculus savanna *Bon.*
82. Pœcetes gramineus *Baird.*
83. Coturniculus passerinus *Bon.*
84. " Henslowii *Bon.**
85. Ammodromus caudacutus *Sw.*
86. " maritimus *Sw.*
87. Junco hyemalis *Sclater.**
88. Spizella pusilla *Bonap.*
89. " socialis *Bonap.*
90. Melospiza melodia *Baird.*
91. Helospiza palustris *Baird.*
92. Guiraca ludoviciana *Swain.*
93. Cyanospiza cyanea *Baird.*
94. Pipilo erythrophthalmus *Vieill.*
95. Dolichonyx oryzivora *Swain.*
96. Molothrus pecoris *Swainson.*
97. Agelæus phœniceus *Vieill.*
98. Sturnella magna *Swain.*
99. Icterus spurius *Bon.**
100. " Baltimore *Bon.*
101. Quiscalus versicolor *Vieill.*
102. Corvus americanus *Aud.*

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103. Cyanura cristata *Sw.*
104. Ectopistes migratoria *Sw.*
105. Zenædura carolinensis *Bon.*
106. Cupidonia cupido *Baird.**
107. Bonassa umbellus *Steph.*
108. Ortyx virginianus *Bonap.*
109. Ardea herodias *Linn.*
110. Ardetta exilis *Gray.*
111. Botaurus lentiginosus *Steph.*
112. Butorides virescens *Bon.*
113. Nyctiardea Gardeni *Baird.*
114. Oxyechus vociferus *Reich.*
115. Ægialeus melodus *Reich.*
116. Squartarola helvetica *Cuv.*
117. Philohela minor *Gray.*
118. Gallinago Wilsonii *Bonap.*
119. Symphemia semipalmata *Hartl.*
120. Tringoides macularius *Gray.*
121. Bartramia laticauda *Less.*
122. Rallus virginianus *Linn.*
123. Porzana carolina *Vieill.*
124. Fulica americana *Gmel.**
125. Anas obscura *Gmel.**
126. Mergus americanus *Cass.**
127. " serrator *Linn.**
128. Aix sponsa *Boie.*
129. Thalassidroma Leachii *Temm.*
130. Sterna hirundo *Linn.*
131. " macroura *Naum.*

II. *Resident Species.*

Of a few species more properly to be regarded as spring and autumn or summer visitors, a few individuals are sometimes found in winter, as of *Ceryle alcyon*, *Turdus migratorius*, *Melospiza melodia*, &c., but since the majority are migratory, they are not placed in the list of resident species.

1. Falco anatum *Bon.*
2. Tinnunculus sparverius *Vieill.*
3. Buteo borealis *Vieill.*
4. Circus hudsonius *Vieill.*
5. Haliætus leucocephalus *Savigny.*
6. Bubo virginianus *Bonap.*
7. Scops asio *Bonap.*
8. Otus americanus *Bon.*
9. Brachyotus Cassinii *Brew.*
10. Syrnium nebulosum *Gray.*
11. Nyctale acadica *Bonap.*
12. Picus villosus *Linn.*
13. " pubescens *Linn.*
14. Hylotomus pileatus *Baird.*
15. Certhia americana *Bon.*
16. Sitta carolinensis *Gmel.*
17. Parus atricapillus *Linn.*
18. Astrigalinus tristis *Cab.*
19. Corvus americanus *Aud.*
20. Cyanura cristata *Swain.*
21. Cupidonia cupido *Baird.*
22. Bonasa umbellus *Steph.*
23. Ortyx virginiana *Bonap.*
24. Fulica americana *Gmel.*
25. Anas obscura *Linn.*
26. Mergus americana *Cass.*
27. " serrator *Linn.*
28. Colymbus torquatus *Brunn.*

III. *Winter Visitants.*

Those species marked with a star are occasional or irregular visitors, but some of them sometimes occur in great abundance. A few individuals are often found in winter of some of those species properly to be considered as spring and autumn visitants, and as such are placed in the next list below.

1. Astur atricapillus *Bon.*
2. Archibuteo lagopus *Gray.*
3. " Sancti-Johannis *Gr.*
4. Aquila canadensis *Cass.**
5. Syrnium cinereum *Aud.**
6. Nyctale Richardsonii *Bon.**
7. Nyctea nivea *Gray.*
8. Picoides arcticus *Gray.**
9. Regulus satrapa *Licht.*
10. Ampelis garrulus *Linn.**
11. Collyrio borealis *Baird.*
12. Troglodytes hyemalis *Vieill.*
13. Sitta canadensis *Linn.*
14. Parus hudsonicus *Forst.**
15. Eremophila cornuta *Boie.*
16. Pinicola canadensis *Cab.**
17. Chrysomitris pinus *Bonap.*
18. Curvirostra americana *Wils.*
19. " leucoptera *Wils.**
20. Ægiothus linaria *Cab.**

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21. Plectrophanes nivalis *Meyer.*
22. Centrophanes lapponicus *Kaup.**
23. Spizella monticolor *Baird.*
24. Tetrao canadensis *Linn.**
25. Arquatella maritima *Baird.*
26. Anser hyperboreus *Pallas.*
27. " Gambellii *Hartl.*
28. Dafila acuta *Jenyns.*
29. Bucephala americana *Baird.*
30. " albeola *Baird.*
31. Histrionicus torquatus *Bon.*
32. Camptolæmus labridorius *Gr.*
33. Melanetta velvetina *Baird.*
34. Pelionetta perspicillata *Kaup.*
35. Oidemia americana *Swain.*
36. Somateria mollissima *Leach.*
37. " spectabilis *Leach.*
38. Erismatura rubida *Bonap.*
39. Lophodytes cucullatus *Rich.*
40. Sula bassana *Briss.*
41. Graculus carbo *Gray.*
42. " dilophus *Gray.*
43. Puffinus major *Faber.*
44. " fuliginosus *Strick.*
45. Puffinus anglorum *Temm.*
46. Stercorarius pomarinus *Temm.*
47. " parasiticus *Temm.*
48. " cepphus *Ross.*
49. Larus leucopterus *Faber.**
50. " marinus *Linn.*
51. " Smithsonianus *Coues.*
52. " delawarensis *Ord.*
53. Chroicocephalus atricilla *Lawr.*
54. " Philadelphia *Lawr.*
55. Rissa tridactyla *Bonap.*
56. Sterna macroura *Naum.*
57. Colymbus septentrionalis *Linn.*
58. Podiceps Holbollii *Reinh.*
59. " cristatus *Lath.*
60. " cornutus *Lath.*
61. Utamania torda *Leach.*
62. Mormon arctica *Illiger.*
63. Uria grylle *Latham.*
64. Cataractes troile *Bryant.*
65. " ringvia *Bry.*
66. " lomvia *Bry.**
67. Mergulus alle *Vieill.*

IV. *Spring and Autumn Visitants.*

Of some species properly regarded as spring and autumn visitants, a few individuals remain through the winter, in sheltered situations, or through the summer, now and then breeding. Those of which some remain in winter are marked with this *; those in summer, with this †. There may be a few other species of this character not thus marked, as *Empidonax flaviventris*, *Vireo solitarius*, &c., that should be.

1. Hypotryorchis columbarius *Gr.*
2. Pandion carolinensis *Bon.*
3. Empidonax flaviventris *Baird.*
4. Turdus Pallasii *Cab.*†
5. { Turdus Swainsonii *Cab.* " aliciæ *Baird.*
6. Regulus calendula *Licht.*
7. Anthus ludovicianus *Licht.*
8. Geothlypis Philadelphia *Bd.*
9. Oporornis agilis *Baird*
10. Helmitherus Swainsonii *Bon.*
11. Helminthophaga pinus *Baird.*
12. " chrysoptera *Bd.*
13. " celata *Baird.*
14. " peregrina *Baird.*
15. Dendroica coronata *Gray.*
16. " castanea *Baird.*
17. " striata *Bd.*
18. " maculosa *Bd.*
19. " tigrina *Bd.*
20. Dendroica palmarum *Bd.*
21. Wilsonia pusilla *Bon.*
22. Euthlypis canadensis *Cab.*†
23. Vireo solitarius *Vieill.*
24. Zonotrichia leucophrys *Swain.*
25. " albicollis *Bon.*
26. Junco hyemalis *Sclat.**†
27. Helospiza Lincolnii *Baird.*
28. Passerella illiaca *Sw.*
29. Scolecophagus ferrugineus *Sw.*
30. Charadrius virginicus *Borck.*
31. Ægialeus semipalmatus *Reich.*
32. Strepsilas interpres *Illig.*
33. Phalaropus Wilsonii *Cab.*
34. " hyperboreus *Temm.*
35. " fulicarius *Bonap.*
36. Macroramphus griseus *Leach.*
37. Tringa canutus *Linn.*
38. Ancylochilus subarquata *Kaup.*
39. Pelidna americana *Coues.*

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40. Actodromas maculata *Cass.*
41. " pusillus *Coues.*
42. " Bonapartii *Cass.*
43. Calidris arenaria *Illig.*
44. Ereunetes pusilla *Cass.*
45. Micropalama himantopus *Bd.*
46. Gambetta melanoleuca *Bon.*
47. " flavipes *Bon.*
48. Rhyacophilus solitarius *Bon.*
49. Tringites rufescens *Cab.*
50. Limosa fedoa *Ord.*
51. " hudsonica *Swain.*
52. Numenius longirostris *Wils.*
53. " hudsonicus *Lath.*
54. " borealis *Lath.*
55. Porzana noveboracencis——?
56. Bernicla canadensis *Boie.*
57. " Hutchinsii *Bon.*
58. Bernicla brenta *Steph.*
59. Anas boschas *Linn.*
60. Nettion carolinensis *Bd.*
61. Querquedula discors *Steph.*
62. Spatula clypeata *Boie.*
63. Chaulelasmus streperus *Gr.*
64. Mareca americanca *Steph.*
65. Fulix marila *Baird.*
66. " affinis *Bd.*
67. " collaris *Bd.*
68. Aythya americana *Bonap*
69. " vallisneria *Bon.*
70. Harelda glacialis *Leach.*
71. Procellaria glacialis *Linn.*
72. Sterna frenata *Gambel.*
73. Hydrochelidon fissipes *Gray*
74. Podilymbus podiceps *Lawr.*

V. *Summer Visitants.*

Of some species of which the greater part are merely summer visitants a few individuals remain in winter, but not enough to entitle the species to be considered resident, and are marked thus * ; those of which the greater part pass north to breed, thus † ; those of which but few reach us in summer from the south, thus ‡.

1. Accipiter Cooperii *Bon.*
2. " fuscus *Bon.*
3. Buteo lineatus *Jard.**
4. " pennsylvanicus *Bon.*
5. Coccygus americanus *Bon.*
6. " erythrophthalmus *Bp.*
7. Sphyropicus varius *Baird.*
8. Melanerpes erythrocephalus *Sw.*
9. Colaptes auratus *Swain.*
10. Trochilus colubris *Linn.*
11. Chætura pelasgia *Steph.*
12. Antrostomus vociferus *Bon.*
13. Chordeiles popetue *Baird.*
14. Ceryle alcyon *Boie.**
12. Tyrannus carolinensis *Bd.*
16. Myiarchus crinitus *Cab.*‡
17. Sayornis fuscus *Baird.*
18. Contopus borealis *Baird.*
19. " virens *Cab.*
20. Empidonax Traillii *Bd.*
21. " minimus *Bd.*
22. " acadicus *Bd.*
23. Turdus mustelinus *Gmel.*
24. " fuscescens *Steph.*
25. " migratorius *Linn.**
26. Sialia sialis *Baird.*
27. Mniotilta varia *Vieill.*†
28. Parula americana *Bon.*
29. Geothlypis trichas *Cab.*
30. Icteria viridis *Bon.*‡
31. Helmitherus vermivorus *Bon.*
32. Helminthophaga ruficapilla *Bd.*
33. Siurus aurocapillus *Sw.*
34. " noveboracensis *Nutt.*†
35. Dendroica virens *Bd.*
36. " canadensis *Bd.*†
37. " Blackburniæ *Bd.*†
38. " pinus *Bd.*
39. " pennsylvanicus *Bd.*
40. " æstiva *Bd.*
41. " discolor *Bd.*
42. Wilsonia minuta *Bon.*
43. Setophaga ruticilla *Sw.*
44. Pyranga rubra *Vieill.*
45. Hirundo horreorum *Bart.*
46. " lunifrons *Say.*
47. " bicolor *Vieill.*
48. Cotyle riparia *Boie.*
49. Progne purpurea *Boie.*
50. Ampelis cedrorum *Baird.*
51. Vireo olivaceus *Vieill.*
52. " gilvus *Bonap.*
53. " noveboracensis *Bon.*
54. " flavifrons *Vieill.*

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55. Mimus polyglottus *Boie.*‡
56. Galeoscoptes carolinensis *Cab.*
57. Harporhyncus rufus *Cab.*
58. Cistothorus palustris *Cab.*
59. " stellaris *Cab.*
60. Troglodytes ædon *Vieill.*
61. Carpodacus purpureus *Gr.**†
62. Passerculus savanna *Bon.*
63. Poœcetes gramineus *Bd.*
64. Coturniculus passerinus *Bon.*
65. " Henslowii *Bon.*
66. Ammodromus maritimus *Sw.*
67. " caudacutus *Sw.*
68. Spizella pusilla *Bon.*
69 " socialis *Bon.*
70. Melospiza melodia *Baird.*
71. Helospiza palustris *Bd.*
72. Euspiza americana *Bon.*
73. Guiraca ludovicana *Sw.*
74. Cyanospiza cyanea *Baird.*
75. Pipilo erythophthalmus *Vieill.*
76. Dolichonyx oryzivorus *Sw.*
77. Molothrus pecoris *Sw.*
78. Agelæus phœniceus *Vieill.*
79. Sturnella magna *Swain.**
80. Icterus spurius *Bon.*‡
81. Icterus Baltimore *Daud.*
82. Quiscalus versicolor *Vieill.*
83. Ectopistes migratorius *Sw.*
84. Zenædura carolinensis *Bon.*
85. Ardea herodias *Linn.*
86. Ardetta exilis *Gray.*
87. Botaurus lentiginosus *Steph.*
88. Butorides virescens *Bon.*
89. Nyctiardea Gardenii *Bd.*
90. Oxyechus vociferus *Reich.*
91. Ochthodromus Wilsonius *Reich.*‡
92. Ægialeus melodus *Cab.*
93. Squartarola helvetica *Cur.*
94. Hæmatopus palliatus *Temm.*
95. Philohela minor *Gray.*
96. Gallinago Wilsonii *Bon.*
97. Symphemia semipalmata *Hartl.*
98. Tringoides macularius *Gray.*
99. Bartramia lacticauda *Less.*
100. Rallus virginianus *Linn.*
101. Porzana carolina *Vieill.*
102. Aix sponsa *Boie.*
103. Sterna hirundo *Linn.*
104. " paradisea *Brunn.*‡
105. " aranea *Wils.*
106. " fuliginosa *Gm.*‡

VI. *Accidental and Irregular Visitors.*

The following species are known in this State merely as rare chance visitors, a few only excepted, from the common habitat of their respective species. The others are very irregular in their visits. There are many other species so extremely rare that there are but few known instances of their capture in the State; but from what is known of their distribution we are not to regard them in the light of chance visitors.

1. Cathartes atratus *Lesson.*
2. " aura *Ill.*
3. Falco candicans *Gmelin.*
4. Syrnium cinereum *Aud.*
5. Nyctale Richardsonii *Bon.*
6. Picoides arcticus *Gray.*
7. Centurus carolinus *Bon.*
8. Icteria viridis *Bon.*
9. Pyranga æstiva *Vieill.*
10. Ampelis garrulus *Linn.*
11. Mimus polyglottus *Boie.*
12. Parus hudsonicus *Forster.*
13. Curvirostra leucoptera *Wils.*
14. Ægiothus linaria *Cab.*
15. Centrophanes lapponicus *Kaup.*
16. Chondestes grammaca *Bon.*
17. Helospiza Lincolnii *Baird.*
18. Euspiza americana *Bon.*
19. Cardinalis virginianus *Bon.*
20. Quiscalus major *Vieill.*
21. Corvus carnivorus *Bartram.*
22. " ossifragus *Wils.*
23. Tetrao canadensis *Linn.*
24. Garzetta candidissima *Bon.*
25. Herodias egretta *Gray.*
26. Florida cærulea *Baird.*
27. Ibis Ordii *Bon.*
28. Ochthodromus Wilsonius *Reich.*
29. Rallus crepitans *Gm.*
30. Gallinula galeata *Bon.*
31. " martinica *Lath.*
32. Bernicla leucopsis *Linn.*
33. Nettion crecca *Kaup.*
34. Mareca penelope *Bon.*
35. Sterna paradisea *Brunn.*
36. " fuliginosa *Gm.*

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Summary.

Number of species found at Springfield	195
" " " " in the State	296
" " " that breed in the State	131
" " resident species	28
Winter visitants	67
Spring and Autumn visitants	75
Summer visitants	106
Chance visitors	85

Springfield, April, 1864.

Supplemental Notes. While the preceding paper has been passing through the press the following facts have been ascertained:

A specimen of the Snowy Owl (*Nyctea nivea* Gray) was taken in Springfield, the present year, about May 20th. Another instance of its capture here late in May has occurred within a few years. It has been found here repeatedly in November, and consequently spends at least half the year here.

A specimen of the Yellow-billed Cuckoo (*Coccygus americanus* Bonap.) was killed here in May this year, by Mr. B. Hosford, who informs me that he obtained another specimen here several years since. The capture of only three specimens of this species at Springfield has as yet come to my knowledge.

That the Hermit Thrush (*Turdus Pallasi* Cab.) does occasionally breed at Springfield I am now convinced, having seen a specimen shot here in July, but the instances appear to be extremely rare

In the preceding list of the Birds of Springfield, the Prairie Warbler (*Dendroica discolor* Baird) is mentioned as rare, and as not breeding at Springfield. I find it not uncommon in sandy fields, growing up thinly to pitch pines, the present summer, where it is breeding quite plentifully. It was not uncommon in June to hear several males singing at a time.

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A pair of Yellow-breasted Chats *(Icteria viridis* Bonap.) are breeding here the present season. Noticed another pair in Ludlow, Mass., about June 3d, which were probably also breeding. Have seen a specimen taken in Berkshire county, in the breeding season. Only straggling pairs of this species, however, reach Massachusetts.

The following species of Hawks, though extremely rare in winter, should probably be properly included in the above list of "Resident Species:" *Hypotriorchis columbarius* Gr., *Accipiter Cooperii* Bon., *A. fuscus* Bon., *Buteo lineatus* Jard., and *B. pennsylvanicus* Bon.

July, 1864.

V. *Notes on the Habits of some species of Humble Bees.* By F. W. Putnam.

(Communicated October 22, 1863.)

During the summer of 1862, while in Warwick, Mass., my attention was called to the Humble Bees by finding three nests of *Bombus fervidus* Fabr. and *B. vagans* Smith. These nests were formed of the deserted nests of mice, one under a barn in an old stump of a tree, the other two under piles of stones in a field. One of the nests of *B. fervidus* I kept in a box for some time, and watched the actions of the bees, but as I then neglected to make full notes, and as my first observations were confirmed by later ones, I allude to them here only to introduce an incident which has relation to the duration of life of the various kinds which always compose the communities of the Humble Bees. Upon leaving Warwick I left my valise, in which was a nest of bees, at the depot. Two months afterwards, in November, it was brought to me, when upon examining the nest several large queen bees were found in a lively condition, while the males, small females and workers were all dead. When the valise was left at the depot there was but one queen in the nest. This incident proves that the queens are not only late in leaving the cells, but that they are capable of enduring cold which is

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fatal to the other bees. In the summer of 1863 while at Bridport, Vt., on the borders of Lake Champlain, I was so successful, in my entomological excursions, as to find as many as twenty-five or thirty colonies of bees, and to collect fifteen complete nests. These were of the following species: *Bombus fervidus* Fabr., *B. ternarius* Say, *B. separatus* Cresson and *B. virginicus* Fabr. As the general economy of these four species is the same, my observations may be considered as made upon one community, preceded however by the following special statements in regard to the several species.

BOMBUS TERNARIUS. Two nests collected: one under an old stump in a deserted mouse nest; the other, in September, under the clapboards of a house, about eight feet from the ground. Upon removing the boards, a large bunch of sheep's wool was found, evidently collected by rats, as there was a quantity of nut shells, with the under jaw and other bones of a rat among the wool. In the centre of the wool the bees had their cells. By etherizing the bees twenty-eight specimens were collected, which, as it was after dark, when the bees are generally at home, I have reason to believe were nearly all that belonged to the nest. There were thirty-five cells containing young, and thirty that were filled with honey, having their tops covered with wax. This is the only instance of my finding *the honey cells closed over*. There were also a number of bunches of pollen in which there were no eggs.

This species is not so common as B. fervidus and is far more savage in its disposition. I was informed by Mr. Brigham Rockwood, that he had noticed that this species never takes possession of the nests of mice *(Arvicola)* which are found so plentifully among the grass, but always chooses a place under cover of boards or stumps.

BOMBUS FERVIDUS. This is the most common species at Bridport, and is of quite a gentle disposition, allowing its nest to be disturbed for some time before it makes any show of resistance, merely exhibiting its uneasiness by buzzing. The communities of this species are found in old mice nests, both under stumps and boards; and also among the grass in the nests of the common field mice *(Arvicola riparia)*. They also occupy the forsaken nests

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of the house mice, as in one instance a colony was found under the flooring of a shed, in a nest made of bits of paper, rags, &c. This was the largest community collected, consisting of about seventy adult bees, one hundred and fifty cells containing young, and two hundred young larvæ, in various stages of growth, in the pollen masses, besides fifty cells filled with honey. This nest was found on the 23d of July. July 28th a nest was discovered in which there was a single queen bee and five or six large queen cells still soft and recently finished.

July 8th. Two queens were seen fighting upon the outside of a nest. So firmly were they united that they did not part until placed in alcohol, although pushed about for some time. They were both of the same species, but one might have been an invader, as I have found upon placing a strange queen, in a nest, that the rightful sovereign immediately commenced battle and in a short time expelled the intruder.

One community kept under glass on a window, with free ingress and egress, continued working, until, on a very hot day, the young became baked in their cells, by the heat of the sun. Then the old ones left and did not return.

Aug. 6th. A nest was brought home and the cells, containing young, placed apart from all old bees for the purpose of ascertaining if the young bee cuts its own way out of its cell. The cells were all of large size. In about half an hour a queen bee had come out and was seen walking over the other cells. She was immediately removed and the other cells were examined, but no signs of their having been cut could be seen. In the evening a slit was noticed in one of the cells and the young bee was seen at work cutting with its jaws. In a short time it made an opening in the cell large enough for it to push its head through. It then commenced cutting on each side, from the slit, above and below; now and then withdrawing its head and resting. Then it tried to force its way through the opening, but finding this was not large enough it cut a little more. The bee evidently did not wish to work more than was necessary, for it often tried to force its way out. At each attempt it made but a small enlarge-

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ment of the orifice; but, after spending half an hour in alternate work and rest, it succeeded in freeing itself from its prison. Then it stood, for a short time, on the sides of the cell, moving its wings, after which it commenced walking over the other cells. This was a queen bee. Aug. 8th, another bee came out in the same way. Aug. 10th, two. Aug. 14th, one. Aug. 15th, another, which was the last in the cells. They were queens and all quite light colored when just from the cells.

These facts prove that the young cut their own way out of the cells. In another nest a young bee was seen to come from the cell while the old bees were present, which did not concern themselves about the matter further than to give a few passing glances and to cut off some jagged pieces of the cell. As soon however as the young bee was out of the cell, one or two old bees trimmed the edges of the cell and removed a few fragments from the inside.

BOMBUS SEPARATUS. Several colonies of this were found under old stumps and in other situations similar to those in which the nests of B. fervidus were found. This species is nearly as ferocious, on being disturbed, as B. ternarius.

BOMBUS VIRGINICUS. A single nest of this species was found under an old stump in an orchard. On the 27th of August three males were captured while flying under a large tree on which they frequently alighted. So much did these bees resemble large flies in their actions, that at first I mistook them for those insects. Male Humble Bees are often seen flying in this manner under trees. Are they not the drones which have left or been driven from the nest?

Let us now notice the life of a colony in its different stages. In the spring, the queen bee, having left her old home, may be seen roaming about in search of a new one, which she soon finds in some such place as previously described. She immediately collects a small amount of pollen mixed with honey, and in this deposits from seven to fourteen eggs, gradually adding to the pollen mass until the first brood is hatched. She does not wait, however, for one brood to be hatched before laying the eggs of

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another, but, as soon as food enough has been collected, she lays the eggs for a second. The eggs are laid, in contact with each other, in one cavity of the mass of pollen, with a part of which they are slightly covered. They are very soon developed; in fact the lines are nowhere distinctly drawn, between the egg and the larva, the larva and pupa, and again between the latter and the imago; a perfect series, showing this gradual transformation of the young to the imago, can be found in almost every nest.

As soon as the larvæ are capable of motion and commence feeding they eat the pollen by which they are surrounded, and gradually separating, push their way in various directions. Eating as they move and increasing in size quite rapidly, they soon make large cavities in the pollen mass. When they have attained their full size they spin a silken wall about them, which is strengthened by the old bees covering it with a thin layer of wax, which soon becomes hard and tough, thus forming a cell. The larvæ now gradually attain the pupa stage and remain inactive until their full developement. They then cut their way out and are ready to assume their duties as workers, small females, males or queens according to their individual formation.

It is apparent that the irregular disposition of the cells is due to their being constructed so peculiarly by the larvæ. After the first brood, composed of workers, has come forth, the queen bee devotes her time principally to her duties at home, the workers supplying the colony with honey and pollen. As the queen continues prolific, more workers are added and the nest is rapidly enlarged.

About the middle of summer, eggs are deposited which produce both small females and males, and it is supposed by some observers that it is from the union of these, at the last of the season, that the eggs are laid from which the queens are developed: but there seems some reason to doubt this, as a new nest, previously mentioned, was found on the last of July occupied only by a queen and queen larvæ. It is true, however, that all eggs, laid after the last of July, produce the large females, or queens, and, the males being still in the nest, it is presumed that the queens are impregnated at this time, as, on the approach

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of cold weather all, except the queens, of which there are several in each nest, die.

The efforts of my friend Mr. Rockwood to procure nests for me during the winter have as yet been unsuccessful, those which he had marked for removal having been destroyed by mice.

It is desirable to ascertain whether the queens remain torpid during cold weather and what use is made of the pollen and honey stored during the last of summer and in the fall, which perhaps is food for the queens during the mild weather in spring before plants are in blossom.

But little wax is made by the Humble Bees, as it is only used for covering the cocoons of the larvæ, for thinly lining the nest on the inside, strengthening the old cells which are used for honey pots, and occasionally covering these pots, and propping up the old cells.

During some years Humble Bees are very numerous. This is generally the case when a dry and early spring is followed by a summer producing a good crop of clover. After such a season, if the following spring be favorable, nests are very abundant.

Though very similar to those made by Reaumer, over a hundred years ago, it will be noticed that my observations differ, in several particulars, from those made by some European naturalists who have written on the Bombi.

Some observers have stated that the eggs of the Humble Bee are deposited in cells, partly filled with pollen, which are enlarged by the workers as the young increase in size, and that the old bees, cutting holes in the cells, feed the young until they are fully developed when they relieve them from their prisons. This is quite contrary to the results of my observations in New England.

At present I cannot believe that the peculiarity of food, or the structure of the cells, produces a difference of developement in Humble Bees, for the larvæ, as has been previously stated, were seen to make their own cells from the pollen paste, while the old bees were quite indiscriminate in selecting the plants from which they procured both pollen and honey.

Is it not more natural to believe, as has been suggested to me by Professor Wyman, that the difference in the de-

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velopement of the eggs is owing to their being laid at various times after impregnation? Thus, if I am right in supposing that the queens are impregnated by the males late in the summer, the eggs laid soon after produce the large queen larvæ: the next set of eggs, laid in the spring, produce the workers, or undeveloped females, while from those deposited still later, male bees are principally developed.

This opinion seems to be corroborated by the state of the nest, previously noticed, found on the 28th of July, which had been recently commenced and contained only *queen* cells, the parent queen being obliged, by her recent impregnation, to lay only such eggs as were adapted to the season. As no first brood of workers, or second one of males and small females, had existed in this nest, the eggs producing the queen larvæ must have been laid by the large female or queen, found in the nest, and not by a small female.

The fact, that our species of Humble Bees take possession of the nest of mice and rats, accounts for the large number of *mites* found in most nests.

Three parasites are common in the nests of our New England Humble Bees. They are, a small beetle of the genus *Byturus* only known thus far in the imago state; a moth of the genus *Nephopteryx*: the larvæ of which is quite abundant in most nests, and a dipterous insect which is often found in the larval state.

It is singular that in all the nests, which I collected, not a single specimen of *Apathus* was found by Mr. Packard, though this parasitic bee is generally supposed to be quite common in the nests of Bombi.

Additional Notes, August 3, 1864. A nest of *Bombus pennsylvanicus* was found at Upton, Me., on the sixth of last June, in which there was but a single queen bee with seven cells of the smallest size, containing larvæ, and several eggs in a mass of pollen.

A queen of *B. pennsylvanicus* was taken, on July 20th, under leaves in a wood.

Professor A. E. Verrill found a queen Humble Bee in a torpid state under leaves, before the snow was off the ground in the spring of 1863.

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VI. *Notes on the Leaf-cutting Bee.* By F. W. PUTNAM.

(Communicated Oct. 22, 1868.)

While at Bridport, Vt., I was enabled to make a few observations on the habits of the Leaf-cutting Bee *(Megachile)*. My attention was first called, on the 26th of June, to a female busily engaged in bringing pieces of leaf to her cells, which she was building under a board, on the roof of the piazza, directly under my window. Nearly the whole morning was occupied by the bee in bringing pieces of leaf from a rose bush growing about ten yards from her cells, returning, at intervals of a half minute to a minute, with the pieces which she carried in such a manner as not to impede her walking when she alighted near her hole. About noon she had probably completed the cell upon which she had been engaged, as during the afternoon, she was occupied in bringing pollen, preparatory to laying her single egg in the cell. For about twenty days the bee continued at work, building new cells and supplying them with pollen. At the end of this time she had probably completed her allotted task, as she was not seen again.

On the 28th of July, upon removing the board, it was found that the bee had made thirty cells, arranged in nine rows of unequal length, some being slightly curved to adapt them to the space under the board. The longest row contained six cells. and was two and three quarters inches in length. The cells averaged about one half an inch in length; the whole leaf structure being equal to a length of fifteen inches. Upon making an estimate of the pieces of leaf in this structure, it was ascertained that there must have been at least a thousand pieces used. In addition to the labor of making the cells, this bee, unassisted in all her duties, had to collect the requisite amount of pollen (and honey?) for each cell and lay her egg therein, when completed. Upon carefully cutting out a portion of one of the cells. a full grown larva was seen engaged in spinning a slight silken cocoon about the walls of its prison, which were quite hard and smooth on the inside, probably owing to the movements of the larva and the consequent

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pressing of the sticky particles to the walls. In a short time the opening made was closed over by a very thin silken web. The cells, measured on the inside of the hard walls, were .35 of an inch in length and .15 in diameter. The natural attitude of the larva is somewhat curved in its cell, but if straightened, it just equals the inside length of the cell.

On the 31st of July two female bees came out, having cut their way through the sides of their cells. Five other cells were opened, in the hope of finding a pupa, but without success; two of them containing larvæ, and three, dead bees fully formed. In these last mentioned cells, several hundred minute Ichneumons were seen, which came forth as soon as the cells were opened.

August 4. Three more bees came out. One was a male, and differed from the female by not having a sting; by its blunt abdomen; by the hairs on the under side being fewer and shorter and not of so deep a red color, and by being very hairy about the underside of the head.

August 5, and 6. A female came out each day, after which no more appeared, the rest of the cells having probably been ichneumoned, as upon being opened in October, by Mr. Packard, Ichneumons were found in nearly all. Most of these parasites being then in the larval or pupal stages, were probably not developed until the spring. Are there two broods of Ichneumons in one year, or are those that came out on the last of July of a different species?*

July 3. A female Megachile was discovered making a cell of pieces of leaf in a small hole in the ground. The hole was about two inches in depth and the cell was just commenced, as there were but four quite fresh pieces in it, which appeared to have been cut from locust leaves. This was of the same species as the one that built her cells on the piazza, and which has been identified by Mr. Packard as *M. centuncularis*.

Another species was also seen cutting pieces from the rose leaves, but its cells could not be discovered. This

* For further observations on these parasites, see Mr. Packard's remarks in the following article.

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was yellow, with the four terminal segments of the abdomen black.

July 22. Two cells of Megachile were brought to me, having been found in the crown of a bonnet in a closet. One of these cells, about half filled with pollen (mixed with honey?) contained a small larva, and was closed by several pieces of leaf which were quite fresh. The other cell was empty and not completed.

August 4. A third species was discovered, in considerable numbers, on the same bushes. These were of about the same color as the preceding, but so much larger as to be easily recognized.

These three species, assisted by a single specimen of a blue species of *Osmia*, which was captured while cutting out a piece of leaf, on the 28th of June, were so numerous, and worked so diligently, that they ruined five or six rose bushes, not leaving a single unblighted leaf uncut, and were forced to take the leaves of a locust tree as a substitute, though they almost invariably hovered over the rose bushes before going to the locust tree.

During the last of August many specimens of the three species of Megachile were collected from the thistle flowers, where they were quite abundant.

VII. *The Humble Bees of New England and their Parasites; with notices of a new species of Anthophorabia, and a new genus of Proctotrupidæ.* By A. S. Packard Jr.

[Communicated April 23, 1864.]

The following descriptions of all the species of Humble Bees known to inhabit New England, together with descriptions of some of their parasites will, it is hoped, draw the attention of entomologists to the great interest attending the study of the growth and economy of our native bees.

Mr. E. T. Cresson in a "List of the North American species of Bombus and Apathus" published in the Proceedings of the Entomological Society of Philadelphia for July, 1863, has given descriptions of over forty species of Bombus, and eight species of Apathus. This has been of

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service to me in distinguishing our species. I have also followed his synonymy of the species therein given.

We have in this country nothing published concerning the economy of our Bombi previous to the present year. For two years past Mr. F. W. Putnam has paid considerable attention to observing the habits of several species of wild bees, the results of which he has embodied in the interesting articles preceding. I am indebted to him for nearly all the material upon which these notices are based: I have also been much aided in identifying the species by a labelled series of most of our species received from Mr. E. Norton several years since, and more recently by a small collection of species from different parts of the country sent by him to the Museum of Comparative Zoölogy at Cambridge, Mass; the Museum also contains over twelve hundred specimens, of four species, in all stages of growth, being the collection made by Mr Putnam. I have also had access to the small collection of this genus in the Harris Cabinet now belonging to the Boston Society of Natural History.

Among the numerous parasites upon the Humble Bee we have insects belonging to the Hymenoptera, the Lepidoptera, Diptera and Coleoptera. Each have a distinct mode of attack. The Stylops and Conops live within the abdomen of the bee upon the fatty tissues of its body The Meloe clings to the outside of its body and sucks in the juices of its victim through the joints of its corneous harness; and after it assumes the pupa stage, passes a period of inactivity safely lodged among the cells of the bee's nest. The Byturus is less intimate in its friendship and probably troubles the bee only as it consumes the stores of food laid up for the bee grub, while it may also prove to be serviceable in acting as a scavenger in clearing the nests of the cadavers of those bees which have perished within their enclosure The unknown dipterous larva noticed below, is undoubtedly, from the structure of its mouth, a carnivorous animal, and lives by sucking in, like a leach, the juices of the young bees. The species of Nephopteryx, which differs so much from its allied species in its habits, feeds largely upon the waxen walls of the bee cells. As to the habits of Apathus,

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in its early stages especially, we know nothing definite. We are not yet acquainted with the forms of the larva and pupa as distinguished from those of the bee upon which it is a parasite, and indeed know the two sexes of but a single species. As yet we know of no ichneumon parasite of Bombus. It will be of interest to determine whether this genus by reason of its secluded habits while in the preparatory stages of its existence, is exempt from the attacks of these vigilant enemies to most other insects.

For a proper study of our Humble bees, we should collect the nests and colonies from the last of May until late in the autumn. We should watch the queen bees as they are searching for deserted mice nests, or other convenient places, in which to rear their colonies, and follow them to their holes. We should then watch for the different broods, and collect the young and mature bees of both sexes, and also of the workers, or undeveloped females; and as it is a well known fact that each sex including the workers are composed of individuals of two sizes, we should endeavor to trace the history of each of the six forms into which the species is specialized and ascertain the functions of each. Early in the spring we can only capture those queens which have survived the winter, while late in the fall we can often secure the males in large numbers, as they frequent autumnal flowers.

It will therefore be necessary in order to collect the young of all these different broods, to take the nests at short intervals during the summer. The cells containing the young, with whatever parasites that may be found among them, may be placed in alcohol, while the mature bees may be pinned. The simplest method of collecting the nests is to visit them before sunrise or after sunset, when all the bees are in the nest and we can secure the whole colony. The bees can be picked up with forceps as they emerge from the nest, or caught with the net and then pinned. Refractory colonies may easily be quelled by pouring in ether or chloroform, or burning sulphur at the aperture, as is the best method of procedure with wasps' nests. The alcoholic specimens of the mature bees may

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be dissected open for the purpose of finding the Stylops and Conops lodged within. The author would be greatly obliged for material to aid him in the study of our wild bees, and would take pleasure in corresponding with those interested in the study of their habits and forms.

BOMBUS FERVIDUS Fabricius.

Male. Head yellow in front both above and below the antennæ. Thorax yellow. Abdomen yellow with the tip black. The black band between the wings is broader than in the female, while also the front is much narrower and the legs and wings are paler. Length, .65—.70; breadth, .30—.32 inch.

Female. Head long in front; black, with a few yellow hairs above the insertion of the antennæ. Whole body lemon yellow except a narrow black band between the wings, and the two black terminal rings of the abdomen. Wings not as dark as in B. pennsylvanicus, but dark smoky. Legs with the second to the fifth tarsal joints very little longer and slenderer than in the females of the other species, though hardly differing from B. pennsylvanicus to which this species seems nearest allied; they are black; tibiæ with fuscous hairs on the tip and along the edges, while the first tarsal joint is dark fuscous above, beneath much lighter. Compared with the male, this sex often differs in having no yellow hairs below the antennæ, while throughout the body the hairs are finer, shorter and more dense. The tip of the abdomen is pure black, while in the male it is partly yellow. Length, 1—1.25; breadth, .40—.45 inch.

Worker. Only differs in size from the female. Length, .40—.60; breadth, .17—.35 inch.

In a nest of this species, collected by Mr. Putnam at Warwick, Mass., which numbered five females and forty workers, all had black fronts below the insertion of the antennæ. But another colony of twenty females and workers from Bridport, Vt., had the fronts almost wholly yellow, with a few exceptions. This was especially marked in the larger sized females, while most of the smaller sized females had black fronts. I am hardly prepared to say that such differences as these

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distinguish the two broods of larger and smaller sized females, but would at present consider that the variation noticed above is not confined to either size.

This species is common in all parts of Maine, and is one of the most common species in New England.

BOMBUS PENNSYLVANICUS Cresson.

Male. "Head black, intermixed with obscure yellowish on the face and vertex; eyes very large and prominent, almost contiguous on the vertex. Thorax above and on the sides tawny-yellow, with a blackish band between the wings; in some specimens the thorax is entirely yellowish. Wings fusco-hyaline, darkest along the costa and towards the base. Legs black; hairs of the basal joint of the posterior tarsi pale; tarsi brown. Abdomen with the first three segments tawny-yellow, slightly mixed with blackish on the base of the first segment; remaining segments black. Beneath black, sparsely clothed with pale hairs. Length 10 lines," Cresson.

Female. Head and eyes as described in B. fervidus but the antennæ are longer and more slender; black in front. The yellow band on the thorax is broader than in the male; in some specimens there are a few yellow hairs on the scutellum. The three basal rings* of the abdomen are yellow above, and the basal one is often partially black, the remaining rings black. First tarsal joint fuscous, much larger than in B. fervidus. In the form of the body this and fervidus are closely allied, both being flatter and a little longer than in the other species. Length 1.05; breadth, .45; expanse of wings 1.85 inch.

The measurement given would indicate that this species was the same size as fervidus, but it is a little larger by about .05 inch.

From want of specimens I am obliged to quote Mr. Cresson's description of the male. This is our least abun-

* For convenience of description in this paper I have practically ignored the fact that the basal ring of the abdomen is in most hymenoptera thrown forward upon the thorax, as I have observed the passage to take place in the semi-pupa state; hence what is in reality the *second* segment of the abdomen is called in this paper the first or basal segment.

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dant species, being very rare in Maine, but growing more abundant as we go southward. My specimens were collected by Mr. Sanborn in the vicinity of Boston.

BOMBUS TERRICOLA Kirby.

Male. Head broad and short, eyes narrow, as in B. fervidus; the front is a little broader than in that species but the eyes do not approximate so much above; there are a few yellow hairs on the vertex, and on the clypeus are a few yellow hairs mixed with black. Front of the thorax yellow, as are the sides; beneath black; no yellow hairs on the scutellum. Basal ring of the abdomen black, the second and third rings yellow, the remainder black, with scattered tawny hairs around the tip. Legs much as in the male of B. fervidus, but the basal joint of the tarsus is more arcuate, being broader in the middle, and narrowing more rapidly towards the base; they are black except the fuscous tarsi, with long black hairs on the under side of the femora, and the tips of the claws are black. Length, .65; breadth, .32 inch.

Compared with B. fervidus the antennæ are nearly one-fourth shorter, so that by this character it would be easily mistaken for a worker, though the hairs are much looser and more uneven than in the other sex.

Female. Head very broad and short, eyes of moderate width, much as in B. pennsylvanicus; front black, discolored with a few yellow hairs above and below the antennæ. There is a narrow line of black on the front edge of the thorax; behind, and extending as far as the insertion of the wings, is a yellow band; beyond, the thorax and basal ring of the abdomen are black. Second and third rings of the abdomen lemon-yellow, the hairs at the base of each ring honey-yellow; remaining rings black with long loose fuscous hairs about the tips and on the hind edge of the penultimate ring, the presence of which easily distinguishes this species from B. pennsylvanicus; beneath smoky black. Wings dark smoky, but not so much so as in the other species. The legs are also paler, but stouter with broader joints, while the femora and the tibiæ are black with smoky black hairs beneath.

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The first tarsal joint is still more arcuate than in B. pennsylvanicus, and broader, while the remaining joints are shorter and thicker and more fuscous. Length, .80—.85; breadth, .45 inch.

Worker, length, .55—.60; breadth, .25—.30 inch.

This species replaces B. pennsylvanicus, in Maine where it is one of the most abundant species. The females are common early in the spring, while the workers first appear in the middle of June. I have one worker from Mr. Sanborn collected about Boston. It may be easily mistaken for De Geer's B. pennsylvanicus but it is shorter, broader and somewhat smaller. In form more regularly elliptical when seen from above than any of the other species. The broad head, honey tint of the basal abdominal rings, shorter antennæ and especially the fuscous hairs about the tip of the abdomen will further distinguish it from De Geer's species. Sometimes a few yellow hairs are present upon the scutellum.

BOMBUS VIRGINICUS Fabricius.

Male. Head short and broad; the front being broader and the eyes narrower than in B. fervidus; the joints of the antennæ are also a little shorter than in that species; vertex of the head yellow; between this and the insertion of the antennæ the front is often black but more often yellow, while the clypeus is covered with black and yellow hairs. Whole thorax above and beneath, the under side of the femora and basal joint of the abdomen yellow, while the rest of the abdomen is black. Beneath on the side of the abdomen are thin yellow hairs; the basal yellow portion on the upper side of the abdomen is indented on the mesial line of the body. The legs are a little slenderer than in B. fervidus, while the tarsal joints are more cylindrical, longer, more dilated and provided with longer and slenderer spines; black; tarsal joints tinged slightly with fuscous brown, with fuscous hairs. The whole body is shorter and broader, more elliptical, the abdomen shorter, the sides converge more towards the acute tips; the wings are paler and the hairs longer and hardly so thick as in B. fervidus. The size of the male is equal

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to that of the worker of B. fervidus. Length, .50—.55; breadth, .25—.30 inch.

I have carefully compared male specimens from Maine and Massachusetts in Dr. Harris' cabinet labelled by him "*Bombus impatiens* Say Ms." They do not differ from undoubted males of B. virginicus, and I agree with Mr. Cresson in considering it as a synonym of our common species.

I have taken the males very abundantly flying about asters and solidagos during the middle of October, when out of twenty males but a single worker of some other species occurred.

Female. Head broader than in B. vagans, front black with a few yellow hairs between the antennæ, and less than the usual number on the vertex. Thorax and basal joint of the abdomen yellow above and on the sides, black beneath; remainder of the body black. Wings paler than usual. Legs with the tarsal joints longer than in B. vagans; the first joint longer and slenderer, with fuscous hairs on the edges, and the remaining joints dilated more than in B. vagans; dark fuscous, with lighter fuscous hairs. Length, .30; breadth, .42; expanse of wings, 1.60 inches.

Worker. Length, .50; breadth, .20 inch.

BOMBUS SEPARATUS Cresson.

Male. Head a little broader than in B. virginicus, to which this species is very closely allied; the eyes are large and full, and the front is narrower by one third than in any other species; vertex yellow, the tuft larger than in B. virginicus; a yellow tuft below not reaching to the base of the labrum; both the maxillæ and lingua are shorter than in B. virginicus; lingua with a single circle of spinules near the tip, which last is longer than in that of B. fervidus; the joints of the antennæ are shorter and more contracted in the middle than usual. Thorax and abdomen colored as described in worker. Legs black; tarsal joints slightly tinged with testaceous; femora beneath thickly clothed with long yellow hairs; first posterior tarsal joint longer and narrower, remaining joints much stouter, though no longer than

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in B. virginicus. Abdomen wholly black beneath. Length, .65; breadth, .35 inch.

Compared with B. virginicus this species is considerably larger; the head when seen from above is much broader, eyes twice as large, outer edge of the fore wings straighter, making the wings more triangular, and they are a little darker. In form the two species are very similar.

Worker. Head short and broad; the front is black, with a transverse yellow tuft just above the antennæ; the hairs are remarkably short, dense and more glossy and velvety than usual. Thorax of a rich lemon-yellow above; in certain lights, especially on the sides, tinged with pruinose. Two basal segments of the abdomen obscurely fuscous, intermixed at the base with yellowish hairs; second ring most distinctly fuscous; remainder of the abdomen black, with very short hairs. Length, .55; breadth, .22 inch.

This species connects B. virginicus with B. vagans and B. ternarius, which last it resembles in its broad head and compact body. The obscurely brick-red base of the abdomen will serve to separate this species from B. virginicus, besides the smooth, glossy, velvety bloom which is due to the short, evenly cut, dense hairs.

Mr. Cresson observes in a letter, "that the second ring of the abdomen varies from yellow to dark fuscous, sometimes quite red. The hairs on the head are sometimes mixed with yellow on the vertex and sometimes entirely black."

Mr. Putnam collected a nest of over twenty workers at Bridport, all of which had the second ring reddish above. At another time a solitary male was captured which did not differ from the workers. Another male was taken near Boston by Mr. Sanborn.

BOMBUS VAGANS Smith.

Male. In form and size closely resembling B. virginicus; the front is wholly yellow. Black; thorax above and beneath, two basal joints of the abdomen and the under side of the femora yellow; beneath, on the side of the abdomen to just before the tip are sparse yellow hairs. Tarsi dark fuscous, with fuscous hairs. Wings pale. Length, .55; breadth, .28 inch.

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Compared with B. virginicus, the head is smaller, antennæ slenderer, front more yellow, and there are not so many yellow hairs beneath the abdomen as in that species, while the first tarsal joint is narrower and all the joints are a little more fuscous.

Female. Head a little narrower than usual; front dark, with a yellow tuft above and below the antennæ. Black; thorax and the two basal abdominal rings pale lemon-yellow. Abdomen wholly black beneath. Legs black; femora beneath black; first tarsal and remaining joints black. Length, .65—.80; breadth, .28—.42; expanse of wings, 1.04 inches.

Worker. Length, .35—.50; breadth, .17—.22 inch.

This species is full and plump. The larger sized females have finer, denser hairs than the workers, where they are more than usually loose and uneven. These last are often found with very pale yellow hairs.

In a colony of thirty workers collected at Warwick, Mass., by Mr. Putnam, there occurred no special variation except in the different shades of yellow on the fronts. It is one of our common species, and occurred abundantly the last of August in company with B. ternarius about Chamberlain Lake at the head waters of the Penobscot river.

BOMBUS TERNARIUS Say.

Female. Head broad and short; front broad with yellow tufts above and below the antennæ. Black; thorax and basal ring of the abdomen yellow; an irregularly defined black band between the wings, sometimes produced behind into a triangular point on the scutellum, extending to the base of the abdomen; second and third abdominal rings red; fourth yellow, and the tip black; beneath black, the posterior edges of the third and fourth abdominal rings provided with yellow hairs. Legs black; tarsi fuscous, especially the inner side of the first joint; femora clothed beneath with yellow hairs. Wings pale smoky, of the same size and form as in B. vagans. Length, .70; breadth, .32; expanse of wings, 1.30 inches.

Worker. Length, .40—.45; breadth, .17—.25 inch.

Male. "Colored same as the female," Cresson.

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Compared with B. vagans, the legs are very similar; the first tarsal joint is however not so broad and convex without, while the remaining joints are much the same.

In a nest of twenty-three specimens collected by Mr. Putnam at Bridport, Vt., the scutellum was invariably yellow. Most of these specimens have the fifth abdominal ring red, so that there are three instead of two red rings. In nearly every case the front of the head was darker than above described, since by their pollen gathering habits the longer yellow hairs easily rub off. It is a common and widely distributed species ranging according to Cresson from Maine to Utah, Puget Sound and Arctic America, and southward to Pennsylvania.

I append the description of three additional species described from Connecticut and New York by Mr. Cresson.

BOMBUS PERPLEXUS Cresson.

"*Male.* Head black, with a tuft of pale hairs in front below the antennæ; vertex yellowish. Thorax bright honey-yellow. Wings hyaline, apical margins faintly clouded. Legs black; base of femora beneath yellowish. Abdomen with the three basal segments bright honey-yellow, the third segment having a slight admixture of black; remaining segments black. Beneath black, slightly mixed with yellowish. Length 8 lines.

Female and *worker* not seen.

One specimen, Connecticut. (Coll. Norton.)

This species closely resembles B. hudsonicus, but the form of the body is more elongate and not so compact as that of the latter species, and the color is much brighter."

BOMBUS BIMACULATUS Cresson.

"*Male.* Head black, mixed with yellowish on the face and vertex. Thorax honey-yellow. Wings sub-hyaline, slightly stained with yellowish. Legs black, clothed with yellowish hairs, especially on the femora beneath. Abdomen with the whole of the first segment above, and the second, except a few black hairs on the middle, and a round black spot on each side, pale honey-yellow; the fourth segment mixed with black and yellow; the third

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and apical segments black. Beneath yellowish, hairy Length, 7 1-2 lines.

Female and *worker* unknown to me.

One specimen, Connecticut. (Coll. Norton.)"

BOMBUS AFFINIS Cresson.

"*Female.* Head black. Thorax in front and on the sides yellow; between the wings black; scutellum, yellow. Wings fusco-hyaline. Legs black. Abdomen with the whole of the first and the sides and posterior margin of the second segments above yellow; remainder of the second segment rufo-fulvous; remaining segments black; beneath black. Length, 8 lines.

Male. Colored the same as the female, except a slight admixture of yellowish hairs on the vertex. Length, 8 lines.

Canada, (Saunders); and New York, (Coll. Norton.)"

APATHUS.

The genus *Apathus* may be distinguished from *Bombus* by the males having broader fronts, and the tibiæ being convex instead of concave on the outer side, the whole joint being rounder and thicker, while the first tarsal joint is longer and not so convex on the posterior edge as in Bombus, being very straight and oblong.

The females are more easily known by having very acute, triangular, bidentate mandibles instead of having them spatulate and three toothed as in Bombus. The head is also shorter and broader; the front is much broader, since the eyes are a little smaller, as are the ocelli; both the clypeus and labrum are shorter and broader, and the antennæ are a little stouter. The tip of the abdomen is larger, acute, the surface convex and not concave as in Bombus, and the sides are flat, giving the tip a quadrangular form.

APATHUS ASHTONI Cresson.

This is the largest New England species yet discovered and differs very considerably in its coloration from the others.

Female. The head is short and broad, the front broad

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and covered with short wholly black hairs. Thorax lemon-yellow above, descending partially down the sides in front of the fore wings; there is a short lozenge-shaped black space, lying partly on the hinder edge of the meso-scutum and the anterior half of the scutellum, while the hinder convex edge of this last piece is rather broadly margined with yellow. The two basal rings of the abdomen and half of the third are black, while the side of the third is yellow; fifth ring black above, yellow on the sides; tip naked, large, triangular, incurved, with an oval depression on the upper side; beneath, the body is wholly black. Legs stout, short, black: tips of the tibiæ fuscous; the inside of the first tarsal joint partially, or in certain lights, wholly deep fuscous; remaining joints dark fuscous; the fifth one including the claws darker than the others. The wings are a little paler than in A. elatus, with black veins. Length, .75; breadth, .35; expanse of wings, 1.45 inches.

I have taken several female specimens of this handsome species during the middle and last of summer, at Brunswick, Me. There is one specimen, "No. 215," not labelled, in the Harris collection belonging to the Boston Society of Natural History, which, as nothing to the contrary is stated, must have been captured near Boston.

In size and form and partially in its colors it is similar to *B. fervidus*, and is perhaps a parasite upon it.

APATHUS CONTIGUUS Cresson.

Male. Front black; vertex yellow; thorax and two basal joints of the abdomen yellow; body beneath, and the five terminal joints of the abdomen black. Legs black; tarsi fuscous, the basal joint blackish except on the edges.

It very closely resembles *B. vagans* Smith, differing from it by the nearly twice as broad front, which is black instead of yellow, as in B. vagans, and the body is entirely black beneath, where B. vagans has long yellow hairs. Length, .67; breadth, .28 inch. (Mus. Comp. Zoöl., Mr. Norton.)

APATHUS CITRINUS Smith.

Male. Front black, a few greyish-yellow hairs on the vertex. Thorax and four baso-abdominal rings covered

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with sparse greyish-yellow hairs, being very thin between the wings, and on the middle of the fourth joint of the abdomen; beneath black. The abdomen is at the extremity a little broader and more incurved than in the preceding species. My specimen is very pale greyish-yellow, Mr. Cresson however describes it as "pale lemon or greyish-yellow above and on the sides," and it is most probable that the specimen before me is hardly mature. Legs, outer half of tibiæ, and tarsi fuscous. Length, .55; breadth, .28 inch. (Mus. Comp. Zoöl., Mr. Norton.)

APATHUS ELATUS Cresson.

Male. Very closely resembling *B. fervidus* Fabr. The head is black, rest of the body, except a black band between the wings, and the black tip of the abdomen deep lemon-yellow. Wings much darker than in the preceding species. Legs black, sometimes dark fuscous; femora clothed with yellowish hairs beneath. The extreme tip of the abdomen has a few fulvous, or yellow hairs. Distinguished from B. fervidus chiefly by the black front. Length, .55—.85; breadth, .25—.35 inch.

NEPHOPTERYX Hübner.

NEPHOPTERYX EDMANDSII nov. sp.

Cinereous, with a decided purplish hue. Head, antennæ, thorax and abdomen rather pale cinereous, concolorous, without any dark scales; palpi much darker at the tips and on the outer side; within paler. Fore wings with two transverse parallel lines; the inner one a little outside of the basal third of the wing; blackish, diffuse, angulated just before the costa, straight below; a slight blackish discal dot; the outer sub-marginal line is situated on the outer fourth of the wing; it is dark within, the outer half pale, straight, angulated acutely opposite the discal dot; not angulated in the costa; just within this line and in front of the discal dot there is a pale patch, free from the dusky scales. An obscure marginal row of dots, the apical one much larger than the others. Fringe pale cinereous. Secondaries, abdomen and legs uniform pale shiny

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cinereous; the former paler towards the internal edge; beneath both wings are nearly concolorous, the primaries a little darker however, but without any markings. Length of the body, .37; expanse of wings, .75 inch.

Larva. Body cylindrical, tapering slightly towards each end. The head is of moderate size and somewhat flattened as usual, presenting the usual semi-elliptical form; the three simple eyes are placed in nearly a straight line parallel with the anterior edge of the pro-thoracic ring. The pro-thoracic (cervical) shield is sub-lunate; each of the two succeeding rings is impressed by three transverse lines, forming four transverse ridges. On the abdominal rings there is but one of these impressed lines like the suture between the different rings, except that it extends only as far as the sides of each ring; like the sutures they are roseate flesh-colored; there are two sub-dorsal rows of minute setiferous tubercles, one on each elevation of the ring; and a similar lateral row; the pleural region is raised considerably; of the nine stigmata, the pro-thoracic one and the last abdominal one are the largest, and the pro-thoracic stigma is placed a little below the line of the others; the supra-anal plate is semi-oval; ten pairs of rather short abdominal (prop-) legs. Of a pale flesh-color with the lines and sutures deeper roseate. Length, .45; breadth, .08 inch.

These larvæ were observed Jan. 16th, twenty or more in number, in a box containing the remains of a nest of *Bombus fervidus* taken during the previous fall at Warwick, Mass. The larvæ had eaten up all the cells, and while some were spinning their thin cocoons, which were very slight compared with those of *Galleria*, the honey-bee moth, others had died for want of food.

Pupa. The body is obtusely spindle-shaped, since the upper and under sides are continuously convex from the head to the tip of the abdomen. Head prominent, the front convex; epicranial piece large and broad, convex behind, on the sides deeply excavated for the insertion of the antennæ; the clypeus nearly round, being convex behind and on the sides, which narrow towards the square slightly concave front; in front of the clypeus is the transversely narrow labrum which is a little produced in

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front and obtusely pointed; in front are two triangular pieces, united for a slight distance along the mesial line, but they soon separate to allow the base of the maxillæ to pass up between them; these last are very long and slender, and with the legs and wings extend down to the anterior edge of the fifth abdominal ring; the forewings are long, narrow and acute, the outer edge very oblique, and continuous with the hind edge; the pro-thorax is short, excavated in front, with a slight mesial tooth; the hind margin convex, with a mesial excavation corresponding to the tooth in front; there is a mesial ridge on the pro- and meso-thorax; the meso-scutellum is soldered in front without suture, behind acutely pointed; behind is (probably) the post-scutellum, transversely linear, but distinct; meta-thorax as usual, square behind; the second pair of wings are visible at their insertion and along the hinder edge. Ten abdominal rings very equal in length, minutely punctured, smooth on the emarginated hind edge; from the fifth, the tip slowly becomes conical; the extreme tip is rather obtuse, not spinous, but with a few hairs. In color it is of the usual reddish testaceous tint, but paler than usual. Length, .34; breadth, .08 inch.

The year after this larva was discovered at Warwick, Mr. Putnam raised it from the larvæ found in bees' nests at Bridport. This species is respectfully dedicated to Miss A. M. Edmands of Cambridge, who was the first to draw attention to its interesting habits. In this respect it differs much from other species of the same genus. Ratzeburg in his "Forstinsecten" figures two species which feed on the pine leaves, and Dr. Clemens* describes the habits of two species which feed upon the American Elm.

Microgaster Latreille.

Microgaster nephopterigis nov. sp.

Male. The body of this species is black with pale and black-brown legs. The eyes are provided with short scattered pale hairs thickest around the margin like those on

*Proc. Acad. Nat. Sci. Philad. p. 205. 1860.

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the head, which is wholly black. The surface is finely punctured, and the front is covered with fine hairs, especially thick on the middle of the clypeus where they form two lines of silvery hairs pointing inwards, while the lines themselves diverge outwards, thus forming a triangular space, and below is another triangle of silvery, but much shorter hairs on the labrum; the four sub-equal jointed labial palpi are pale testaceous; the basal joint darker; the three-jointed maxillary palpi have the middle joint pale, the other two darker. The surface of the black thorax is hardly punctured, but finely and irregularly striated. The pale white wings contrast with the black body; patagia pale testaceous; base of the wings black, nervures pale; the marginal one darkening towards the blackish pterostigma which is a little paler in the middle. Legs black at their base; outer two-thirds of first pair, outer half of second, and tip of third pair of femora pale; fore and middle tibiæ and tarsi pale, hind pair pale on the basal two-thirds; the hind tarsi dark; all three pairs of claws blackish. Abdomen black, with a few pale sparse hairs. Length of body, .13; breadth, .03; length of one primary wing .09 inch.

This species agrees well with the typical European species in most respects. The antennæ are 18-jointed, and the joints are long cylindrical, impressed in the middle by a slight constriction. The neuration is like Ratzeburg's figure of *M. flavilabris*, but the pterostigma is a little broader, and the outer cubital cell is still more incomplete, no traces of the third and outer side of the minute triangular cell being present.

Two males found by Mr. Putnam to be parasitic on the species of Nephopteryx described above, were raised by him while at Bridport, Vt.

Conops Linnæus.

The history of this genus is very fragmentary. I quote from Westwood's "Modern Classification of Insects" a summary of what was known in regard to its habits up to the date of the publication of that work. "These insects are

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generally prettily colored, and are met with upon plants and flowers. The species are parasites in the larva state upon bees, as first discovered by Baumhauer. Latreille also states that the *Conops rufipes* undergoes its transformations in the interior of the abdomen of living humble bees, escaping at the margin of the segment, having reared four specimens of the Conops in a box in which he had placed some of the Bombi; and Messrs. Lachat and Audouin have published an interesting memoir upon an apod larva found in the intestines of *Bombus lapidarius* which Latreille attributed to this species of Conops. M. Robineau Desvoidy has also observed a species of Conops pursuing a Bombus with great patience, and flying on it several times (*Comptes Rendus de l' Acad.* No. 23, 1836), as has also M. Dufour, who, moreover, possesses a *Bombus terrestris* from the anal part of which a *Conops rufipes* is dependent, the swollen extremity of the abdomen of the latter being retained within the former. (*Ann. Sc. Nat.* Jan. 1837.) I have also frequently observed *Myopa atra* flying about sand-banks in which were the burrows of various bees." Vol. II p. 560.

I translate two passages from the memoir of Messrs. Lachat and Audouin*, referred to above, which describe the larvæ and their habits. " A white, very soft and footless larva (figs. 1, 2, 3, 4,) was found the 7th July 1818, between the ovaries above the stomach, between it and the sting and under the dorsal vessel of a *Bombus lapidarius* Fabr. which was deprived of its fat; it had eleven rings, a long neck, a mouth, two lips, two hooks and several papillæ dependant from the skin; the rest of its body was distended, a little furrowed above and beneath, by a longitudinal series of points grouped usually three by three on the side of each ring, which likewise appeared plainly constricted. The extremity opposed to the mouth, corresponds to the rectum of the Bombus, has an anus slit vertically, and two more elevated lateral plates, placed near each other and very curious in their organization and their importance. It bears much resem-

*Mémoire sur une larve apode trouvée dans le bourdon des pierres. Mém. de la Soc. d'Hist. Nat. 1823. Tom. I. p. 326-339. avec fig.

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blance to *Dipodium apiarium* of Bosc, and is like several dipterous larvæ described by Réaumur (Mémoires, tomes IV and V.) M. Latreille refers it to *Conops rufipes* of which he has found four individuals in a box in which he had placed some Bombus terrestris Fabr."

"This larva, then, passes its first three stages, lodged directly within another insect, there living upon the fats, and receiving like most dipterous larvæ, through its posterior openings, an abundant supply of air, that another being inspires for it. Already has M. Dumeril surmised, that from the curvature of its abdomen, the Conops must lay its eggs within the body of some other insect."

The larvæ are represented by the authors as being flask-shaped, convex above, flattened beneath, with the anterior portion of the body elongated and very slender; while upon the obtuse anal extremity are placed the crescentic respiratory organs.

We have nothing new to communicate respecting the habits of this genus, but merely to note the occurrence of a species which is parasitic either upon *Bombus vagans* Smith, or *B. fervidus* Fabr. Unfortunately the specimen died while issuing from the body of the bee so that the wings were not expanded and the colors were not developed; and since a colony of each of the two species above mentioned were pinned in the box, it is uncertain upon which species the Conops was a parasite.

In the dilapidated specimen, which Baron Osten Sacken has referred to the genus Conops after reading my description, the large eyes do not meet on the vertex, but their opposite edges are straight and parallel, leaving the front of the head between them of even width above and below, and as wide as the breadth of either of the eyes; the front is deeply excavated for the reception of the antennæ, on each side of a triangular prominence; the antennæ are apparently three-jointed; the first very long, square, and truncated at the tip; the second is a third shorter than the basal joint, but broader and conical, and continuous with the slender, minute, acute third joint; the proboscis is very long, reaching nearly to the tip of the abdomen and clavate at the extremity. The abdomen is apparently somewhat shrivelled, and is cylindrical, the

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tip a little obtuse and incurved. The legs are large and long, with stout joints and strong claws; the femora are dilated, the tip of the tibiæ much enlarged; and the tarsal joints are broadly triangular.

Notes on an unknown larva allied to that of Volucella.

Westwood (Intr. II. p. 558) states that the "larvæ of Volucella reside in the nests of Bombi and Vespæ, upon the larvæ of which they subsist; they have the body long, narrowed in front, transversely wrinkled, with fine lateral points, and the tail armed with six radiating points; the mouth is armed with two bifid mandibles, and with three pairs of tentacula." The pupæ of this genus have not been described, DeGeer figuring only the larva and imago of *V. bombylans* (*Mém.* tom. vi. tab. 8. fig. 4—9; and see Réaumur, *Mém.* tom. iv. pl. 33.)

Several nests of Bombus fervidus and B. vagans were found by Mr. Putnam to be infested by larvæ which it will be seen agree in many respects with the above description of those of Volucella.

They were 13-jointed. The terminal triangular portion appears to consist of a single ring, though in reality made up of three segments soldered together. In form the larvæ are oval lanceolate, narrowing in front, and the dorsal surface is convex continuously from the head to the anal tip, and beneath flattened; with two dorsal and two lateral rows of stout bristles spinulated at the base. The head is broad oblong, flattened from above; it is nearly as long as the pro-thoracic ring, and two-thirds as broad; very square in front, the sides are parallel and very slightly convex, arising from the front edge of the head, and above the mouth are two minute setæ which do not appear to be jointed, or to differ structurally from the other spinules upon the surface of the body, except that they are simple; these are all the appendages to the head that can be seen when the mouth is retracted; in one specimen however where the mouth is partially thrust out there is seen attached a v-shaped organ (maxillæ?) such as are described as occurring in Volucella; on

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each side and near the base of the head is a convex raised vertical ridge, with its edge armed with obtuse short spines which probably protect a simple eye situated at the bottom of the depression. The middle of the body is nearly twice as wide as the pro-thoracic ring. All the rings are separated by well defined sutures; they are convex, and angularly so on the sides; the spines are very equal in length, the two dorsal rows approximate and are rather remote from the two lateral rows; the tip of the abdomen, which, judging from the three pairs of spines, is originally composed of three rings, is semi-ovate, triangular in form, suddenly flattened above; at the base is a pair of obsolete spines; the remaining spines are longer than those on the front of the body, radiating outwards, but like them are armed at the base with three or four pairs of obtusely bifurcate spinules which stand out stiffly at right angles to the spine itself; the longitudinal anal opening is protected on the sides with minute obtuse spines; on the under side of each ring of the body, with the exception of the terminal one, are two transverse angulated ridges; the front one smooth, while the posterior ridge is provided with a single row of minute teethlike spines. The larvæ are of a dirty pale flesh color. The head is concolorous with the rest of the body and of but little harder consistence. Length, .36; breadth, .10; height, .07 inch.

While bearing a general resemblance to the larva of Volucella as figured by Westwood, they differ in being much narrower, very hairy, or rather spinulated, and the terminal portion of the body is not provided with stout spines as in Volucella, but is continuously hairy with the rest of the body.

I quote in this connection notices by Westwood of other dipterous genera which are parasitic on wild bees, with the hopes of stimulating observers in this country to search for these interesting parasites in the nests of American wild bees.

"Some species of *Anthrax* were supposed by Latreille to be parasitic on bees, while Réaumur (*Mém.* tom. VI. pl. 27. fig. 13) figures *Anthrax morio*, of which he observes. "Plusieurs mouches de cette espèce ont ètè tirèes d'un

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nid creusè dans le bois". p. 290. "All these authors have, however, overlooked the direct observations of Schaffer, who has figured the larva, pupa and imago of Anthrax ornata (or a closely allied species) as one of the parasites in the nest of the Mason bee *(Megachile muraria)* (Abhand. v. Ins. vol. II. pl. 5. figs. 11, 12, 13.)"

"M. V. Audouin has confirmed in his unpublished observations the parasitic habits of *Anthrax morio* by rearing it from the nest of an Anthophora. He has given me one of the exuviæ of the pupa, which retains its previous pupa-form, and exactly resembles the pupa of Bombylius. He remarked that the Anthrax makes its way out of the cell of the bee, immediately before assuming the perfect state, by the assistance of its dorsal spines, in the same manner as Cossus. I have also found exactly similar exuviæ in the nest of Megachile muraria." p. 534.

The muscid genus Tachina besides attacking parasitically grasshoppers, caterpillars, the larvæ of saw-flies and other insects, is known also to frequent the burrows of the smaller species of wild bees, such as the Andrenidæ.

ANTHEROPHAGUS Latreille.

ANTHEROPHAGUS OCHRACEUS Melsheimer.

Female. Pale testaceous honey yellow, with darker antennæ, legs, and elytra; the head and pro-thorax above and beneath are honey yellow; the anterior two-thirds of the head, pro-thorax and elytra is covered with very fine yellowish hairs arising from the fine punctures which cover the upper part of the body; the antennæ are also very finely haired; on the head the minute hairs are arranged longitudinally; while upon the pro-thorax they all converge to a mesial point near the hind edge of the pro-notum. The elytra are a little darker especially along the suture. The ends of the antennal joints, the base of the coxæ and tibiæ, and tip of the terminal joint of the tarsi are black. Length of the body, .16—.18; breadth, .06—.08 inch.

This species was identified for me by Mr. F. G. Sanborn of Boston. He informs me that the species is common

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on the flowers of the sweet briar and other Rosaceæ, but that my female specimen is much larger than usual. Hence the above description will not be out of place.

Both at Warwick, Mass., and at Bridport, Vt., Mr. Putnam found several nests of bees infested by this beetle. Though it is probable from the fondness which these insects manifest for the sweets of flowers, that they visit the nests of the bees for the purpose of consuming the honey stored up within them, we do not as yet know the extent of the injury they cause, or whether in their early stages of growth they are not true parasites.

Larva of MELOE ANGUSTICOLLIS Say.

This insect, as is well known, is parasitic in its early larval stage on the bodies of wild bees, and dwells as a pupa in their nests. I have found them several times upon the bodies of *Bombus*, *Halictus*, and *Andrena*, with their heads plunged in between the head and thorax of their victims. During the flowering of the willows in April, I have found them in abundance upon the flowers, while those bees which had evidently brought them there were more or less infested by them. I have tried in vain as yet to rear the larvæ by feeding the bees with sugar. They are comparatively hardy and with proper care in changing the bees as fast as they die can most probably be raised to maturity. They are very active in their habits, very quickly deserting the half-dead bee for a newly introduced and more lively one.

I would here venture to suggest that there is nothing very abnormal in the development of this genus of Coleoptera, so far as concerns the different forms of the young; judging simply from the form of the *semi-pupa* figured by Newport, which is called by him and previous observers a distinct *form* equivalent to the *larva and pupa form*, I would suggest that that stage is simply the beginning of the pupa form.

In studying the development of *Bombus*, I have ascertained that the semi-pupa takes on a most remarkable form, intermediate between that of the worm-like larva and the

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matured pupa; but the transitional forms between show that they gradually merge together. Owing to the great rapidity with which the pupa is developed beneath the larval skin which in most insects is hard and thick, the intermediate stages pass on so rapidly that we know really little about them.

The "*semi-pupa*," as it may be called of Meloe has not been compared with the similar stage in other Coleoptera, of which we know almost nothing, hence it is not to be wondered at that so philosophic and acute an observer as Newport should call the immature pupa of Meloe, a fourth stage of existance, intermediate between the larval and pupal.

The specific characters of our larva can be best brought out by comparing it with the figure of Newport.* It is shorter and broader throughout. The head and thoracic rings are together longer than the abdomen, which is shorter and more ovate than in the European species; the head is longer and the pro-thoracic ring is longer than the two succeeding rings, where, according to Newport's figure, it is a little shorter than the mesial thoracic ring; the two hinder rings also dilate more on the posterior edge, as do the abdominal rings; the setæ attached to the hinder edge of each abdominal segment, which are large and conspicuous in Newport's figure, are in our species minute, and the terminal setæ are shorter; the legs of our larvæ are a little stouter than in the species referred to. Its color in the young is very pale, becoming in the full sized individuals nearly black. Length, .06; breadth, .02 inch.

Notice of STYLOPS CHILDRENI Gray.

I was fortunate enough during the past spring and after this article was presented to the Institute, to discover the male of this species.

According to Westwood (Modern Class. Insects) this species was discovered in the abdomen of a species of

* Trans. Linn. Soc. Vol. 20, tab. 14.

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Andrena, carried to England from Nova Scotia, which was in the collection of Mr. G. B. Sowerby; it was figured by Prof. Westwood and with many details formed plate 59 of Griffith's Cuvier, Part Insects. Though named by Mr. Gray, no description has ever been made. The insect has not subsequently been noticed by observers in this country.

On the 29th of April I captured an *Andrena placida* Smith flying about the flowers of the Mezercon. This specimen was stylopized, and flying briskly within the nest and in company with the bee was a male Stylops, which agrees in all respects with Westwood's figures, except that he does not represent the abdomen as being long enough. In a few hours my specimen died, and its abdomen long and flexible, which the insect had kept in constant motion, opening and shutting its large and broad anal forceps, soon partially dried up, then resembling more Westwood's figure which must evidently have been taken from a dried specimen. The whole body, the antennæ and appendages of the mouth were velvety black; abdomen slightly brownish; legs and anal forceps pale resinous brown; the tarsal joints, and tips of tibiæ pale testaceous.

I have little doubt but that this male was at the time of capture adhering to the body of the bee in order to unite with the wingless female within the abdomen of the bee, and thus the use of the long flexible abdomen and large terminal forceps are obvious.

Is the wingless specimen a pupa, or female? That it is a female, and was destined in about six weeks to produce immense numbers of young there can be little doubt.*

I proceed to notice a female and young discovered during the preceding year.

On the 18th of June while collecting Hymenoptera which were feeding upon the flowers of the garden Raspberry I captured an *Andrena vicina* Smith, which was stylopized. Near the middle of the abdomen, on the upper side, projected from between the rings, the flat triangular head of the female. Upon drawing out the whole body,

* During the middle of May I captured two more of the same species of *Andrena*, each with a female Stylops within its body.

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which was very extensible, baggy and full of a thin fluid, I examined it under a high power and found multitudes, at least three hundred, of very minute, dust-like Stylops larvæ issuing in every direction from the body of the parent. Most of them issued from near the head, over which they ran, as they must do when the parent is in its natural position, in order to get out upon the surface of the bee. The soft body of the female rapidly dried up, causing the death of many of the larvæ, and as I was unable to rear them, my only object in mentioning them now, is to describe briefly the appearance of the female and the young at the time of birth. It appears therefore that the female does not lay eggs, but is viviparous. Siebold was the first to show that the females were such, though apterous, wormlike, of so abnormal form and so different from the winged male; and it seems a little strange that Westwood and others should call this form a "larva" when they plainly perceived that its body was filled with the newly hatched young. The head of the single female that fell under my observation resembles very closely the figures of Newport in the Linnæan Transactions; it is flattened, triangular, nearly equilaterally so, with the apex or mouth-region obtuse, and the two hinder angles each containing a minute simple eye; the larger part of the head above consists of the epicranium, which is narrowed in front and its edge convex; no clypeus, or labrum can be distinguished; the mandibles are also obsolete, being two flattened portions lying in front of the "gena" and separated from that region by a very distinct suture; the mouth is transverse and opens on the upper side of the head, while in front lies the rather large labium, and the rounded papilliform maxillæ.

The larvæ are in form linear elliptical; head semi-ovate, while the tip of the abdomen is truncate. The sides of the body are continuous, there being no suture between the segments; seen laterally the larva is thickest at the meta-thoracic ring. Two simple eyes are lodged near the base of the head. The body is so transparent that the intestine can be traced easily to just before the tip, where it ends in a *cul de sac*. The two anterior pair of legs are much alike; coxæ short; femora and tibiæ small, cylindri-

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cal; a single slender tibial spur; tarsi consisting of a single clavate joint equalling the tibia in length, much swollen at the tip, where no claws can be discovered; the hind tarsi are longer, very slender, two jointed, the terminal one being bulbous. The pair of terminal stylets inserted in the fourteenth and terminal joint of the body are a little more than one half the length of the body. The whole body, especially the abdomen is partially covered with long setose scales, which project from the side of each ring. In color the body is pale grayish.

In their movements these infinitesimal larvæ were very active, as they scrambled over the surface of the body of the parent or of the glass slide, holding their caudal setæ nearly erect.

Notes on a new species of Anthophorabia parasitic on the Leaf-cutting Bee, and a new genus of Myrmarides probably parasitic on the former.

In Westwood's "Introduction to the Modern Classification of Insects," we find the following notices of chalcid parasites on wild bees and wasps. "Pteromalus apum is parasitic gregariously in the nest of the mason bee. A brood of Encyrtus varicornis was obtained by Esenbeck from a cell of Eumenes coarctata. Réaumur has described and figured *(Mém.* vi. pl. 20, fig. 2, and pl. 21, fig. 3,) a species of Chalcis, which is parasitic in the nests of the American wasp *(Epipone nidulans)* and which he regarded as the female of that wasp." Westwood also mentions that Monodontomerus lives in the nests of Osmia, the mason bee; and on the authority of Audouin states that the same genus is also "parasitic in the provisioned nests of Odynerus, Anthophora and Osmia. The male has most singular antennæ, and minute rudiments of wings, so that it does not quit the cell."

Newport* has given us many new details of the history of the wild bee parasites. He states that the larvæ of Monodontomerus are flat, very hairy, and spin silken co-

* On the Anatomy and Development of certain Chalcidæ and Ichneumonidæ. Trans. Linn. Soc. Vol. 21, 1855.

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coons when about to pupate. The imago appears about the last of June, perforating the cell of the bee. The larva is an "external feeding parasite" consuming the pupa as well as the larva of Anthophora. Very full information is given concerning the habits and structure of two species of a new genus of these minute parasites, which he calls *Anthophorabia*. The males differ remarkably from the females, especially in having simple eyes instead of compound organs of sight, besides the usual three ocelli.

We were fortunate enough in cutting open the cells of *Megachile centuncularis*, brought by Mr. Putnam from Bridport, Vt., to find that nearly a dozen were ichneumoned by these parasites. There were counted in one cell upwards of one hundred and fifty of the larvæ; whereas Mr. Newport only found thirty to fifty in a cell of Anthophora. A few perfect females had hatched out, it being the middle of October, and there were besides a few pupæ, but the large majority were larvæ which have survived the winter as such, so that a new and much larger spring brood of the Chalcids must appear, when it is to be hoped we shall have an opportunity of describing the male. The larvæ were all clustered upon the outside of the dead and dry Megachile larva.

Upon one of the female Anthophorabia I accidentally discovered an exceedingly minute Proctotrupid, one-ninetieth of an inch in length, which I am unable to refer to any known genus, and which will be found partially described on a following page; it is highly probable that it is an egg-parasite, as are most of the Mymaridæ, to which section it properly belongs; and it is not too large to live in the eggs of the Anthophorabia, small as the last named insect is.

ANTHOPHORABIA MEGACHILIS nov. sp.

Female. The head is very stout, broad and flattened posteriorly; the front is rounded ovate, narrowing a little anteriorly; the occiput is very distinct, and its vertex is very considerably elevated and slightly angulated; above the ocelli-bearing piece it is linear, but towards the eyes widens out into a linear triangular portion; in front, is a

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tranversely oblong piece bearing the three ocelli; in front of this is a smooth triangular area which rapidly contracts to a narrow line which connects this area with the anterior portion of the epicranium, thus dividing the front region of the head into two lateral halves composed of the large broad pieces, unusually developed in this genus, which bear the ovate eyes; the anterior portion of the epicranium is narrow triangular, and its surface is very convex; clypeus very short, tranversely linear oblong; the mandibles are long and narrow, their tips very acute and slightly incurved; antennæ nine-jointed; second joint nearly as long as all the remaining ones collectively, a little dilated beyond the middle, but not bent so much as in *A. fasciata* Newp.; the succeeding four joints are shorter and more closely united together than in *A. fasciata* and the three terminal ones are united apparently into a single joint more acute than in the European species. Thorax and abdomen much flattened, hardly convex above; prothorax longer than broad, triangular; meso-scutum very small, trapezoidal, the sides converging a little towards the scutellum, which is larger than the scutum, oblong, twice as long as broad, the sides very exactly parallel and a little convex behind next the curved transversely oblong post-scutellum; on each side is a linear oblong parapsidal piece, and the parapsidal pieces on each side of the scutum are here especially marked, occupying a space larger than the scutum itself; meta-thorax narrow, small, shorter than broad. The fore wings have the costa divided into three convex portions of which the basal third is most convex; the sub-costal nervure follows these convexities, terminating nearly at the outer third of the wing, directed inwards at its extremity towards the middle of the wing, being more incurved than in *A. fasciata.* Hind wings nerveless, lanceolate, obtusely angulated in the middle of the costa, apex sub-acute. The legs are rather long and slender; coxæ long; femora, especially the hind ones, considerably swollen; tibiæ long, slender, not dilated at the extremity, with very slight and unequal spurs; tarsi five-jointed, slender, of very equal length, not dilated at the extremity, hairy and having the tip of each joint provided with a slender spine. The six-jointed abdo-

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men is flattened, oblong, ovate, the sides quite parallel; tip a little obtuse ending in the slightly exserted ovipositor which is only visible from beneath. The body is of a uniform pitchy blackish brown including the entire head and antennæ. The legs are of a uniform pale testaceous honey yellow. Length, .04 inch.

Pupa. Side view. Head and thorax very exactly equal in length to that of the abdomen. The head is very narrow, and the rather long ovate eyes are situated nearly midway between the vertex and the anterior edge of the "gena" near where the antennæ are inserted. The thorax is bent at nearly right angles to itself a little in front of the middle; the terminal half of the antennæ lie near and parallel to the wings and the middle pair of long slender legs, which last reach to the middle of the abdomen. The first pair of legs are seen bent upon themselves midway between the insertion of the wings and the head; only the femora and tibiæ are visible, the tarsi being laid under the antennæ and the front of the head. Only the first pair of wings are visible, being inserted just half way from the vertex of the head to the base of the abdomen; they are long and narrow oblong, and in length equal the distance from the vertex of the head to a point parallel with the base of the abdomen. From under the tip of the wings proceed the tarsi of the last pair of legs, which terminate a little beyond the basal third of the abdomen; they are a little incurved towards the middle of the sternal surface. The meso-scutellum is distinctly seen, and is quite separate from the meta-thorax, when the body of the pupa is slightly contracted. In outline, the abdomen is elongate oval; the pleural line between the tergum and under side runs diagonally from the tergum of the base to near the tip. The minute, slender ovipositor surrounded by the pupal membrane projects considerably beyond the tip.

It differs very considerably from Newport's figure of the pupa (side view) of *A. fasciata.* The head is larger and the vertex much lengthened, rising up beyond the thorax which is stouter and bent at right angles to itself, while in *A. fasciata* it is simply convex. The wings are laid straight upon the side of the body, while in *A. fasciata* they are directed a little forwards.

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Seen from below, in its general outline, the insect is long, narrow, elliptical ovate. The head is ovate, being longer than broad, and narrowing in front of the eyes; the vertex is very high and convex; eyes remote, the intermediate space broad and curvilinearly ridged just within the eyes; between the insertion of the antennæ and the eyes is a broad space; the antennæ are inserted near the anterior fourth of the front of the head; they are elbowed at the end of the second joint, which projects at a right angle beyond the head, thence they are folded upon the sternum, converging slightly, and their very acute tips reach to just before the coxæ of the second pair of legs. All the three pairs of coxæ are visible. The forelegs terminate at the second pair of coxæ. The ovipositor seems as if a continuation of the mesial ridge, and is nearly one-third the length of the entire abdomen.

Larva. Body short and thick, fourteen jointed, cylindrical, both extremities much alike; the larva assumes a lunate form, the head being inclined towards the tip of the abdomen, which is likewise incurved; the head is concolorous with the rest of the body, which is pale, pearly white; the rings are slightly convex, with no lateral raised line; terminal anal segment orbicular and rather large. Length, .04 inch, being one-third as broad as long.

PTERATOMUS* nov. gen.

This genus will be easily distinguished from Anagrus, to which it is nearest related, by the obtusely conical abdomen and the narrower linear wings. The generic characters laid down by authors are so scanty that the comparison with other genera of this group cannot be carried farther. In the figure, a side view of the insect is given, and the following description is made from the insect in that position. Owing to its minute size the single specimen was unfortunately lost from the glass slide before a complete description could be prepared. Hence I am unable to state the number of tarsal joints, or the exact

* From the Greek *pteron*, a wing, and *atomos*, an atom.

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number of the antennal joints, since they could not be distinctly made out with the light used; the figure represents the insect when magnified 250 diameters. It will be noticed that one of the forewings is fissured, while the other is undivided, but has the base of the inner edge of the wing dilated into a tooth-like expansion, at a point corresponding to the origin of the lower branch in the other wing. I am inclined to think that the simple wing is the normal form. The fact that one of the wings is fissured is interesting as showing the tendency of the wings of a low Hymenopterous insect to be fissured like those of Pterophorus and Alucita, the lowest Lepidopterous genera. In the figure I have not attempted to place the wings in their natural position. It will also be noticed that the right hind tibia and tarsus were wanting in the specimen The species, which so far as I am aware is undescribed, is dedicated to my friend Mr. Putnam, who has enabled me to bring it to the notice of entomologists.

PTERATOMUS PUTNAMII nov. sp.

Male. Side view. Head very large, equalling the thorax in size, but surpassing that of the abdomen; in outline sub-rhomboidal, five sided, the vertex being equal in length to the under side of the head; the greatest length of the head is from the base to the obtuse point in front of the eyes; the eyes are large, globose, occupying a third of the side of the head: antennæ equalling in length the thorax; divided into three portions, the basal thick and cylindrical, the fourth joint large and much swollen, while the terminal joints form a slender cylindrical tip. The thorax is short and high; the outline of the tergum is very convex, especially above the insertion of the wings; the hind edge of the meso-scutum extends a little behind the middle of the entire thorax, whence it descends at an angle of 50° to the insertion of the abdomen; the wings are nearly twice the length of the body; the forewings in the single specimen are dissimilar, since one is deeply fissured into two linear spatulate feather-like portions, while the edges of the wing are fringed with long nearly straight hairs; the other primary is as large as the former, but a little longer, it is entire, spatulate, dilated

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slightly on the base of the inner edge, with a central row of fine scales representing a median nervure, and the edges of the wings are fringed with hairs much longer than those on the other wing, and a little curved, thus giving a graceful, feather-like appearance to the wing. The hind wings are half as large, very slender linear and fringed like the forewings. Legs very long and slender, hardly longer than the whole body, hairy on the tibiæ and especially so on the tarsi; coxæ long and narrow; all the remaining joints are very equal in length and size in each pair of legs; femora linear, not swollen; tibiæ linear; tarsal joints very indistinct, slender and hairy beneath; no claws distinguishable. Abdomen compressed, triangular, truncated broadly at the tip which is obtusely rounded. In color the species is of a uniform dark piceous, with pale, almost whitish legs. Length, one-ninetieth of an inch.

A species of mite is also abundant in the nests of bees. According to Mr. Putnam several of our species of Bombus almost invariably occupy the forsaken nests of field mice, and he supposes that these mites which are of comparatively large size, come from the mice. This opinion is most probably the correct one. Mr. Newport has given a most interesting account of a new genus of mites peculiar to Anthophora which lives on that wild bee in all stages of its existence, but mostly while a larva. *Heteropus ventricosus* Newp. was found in immense numbers in the bee cells. When the female mite is full grown, its previously small abdomen swells to an enormous size, so that the animals look like "clusters of microscopic grapes." This immensely distended abdomen serves as a nidus for the young, which it is probable, are born alive, as Lyonnet has observed to be the case with the cheese-mite when exposed to high temperatures. (It is worthy of notice that the viviparous Stylops lives in a high temperature; i. e. in the abdomen of living bees.) We also learn that there are two other genera of Acari peculiar to the Apidæ; the *Trichodactylus* Dufour which is parasitic on Osmia, and *Ansetus* Dujardin.

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EXPLANATION OF PLATE 3.

Fig. 1. APATHUS ASHTONI Cresson.
Fig. 2. NEPHOPTERYX EDMANDSII Packard: 2a, *Larva;* 2b, *Pupa.*
Fig. 3. MICROGASTER NEPHOPTERICIS Packard: 3a, side view.
Fig. 4. ANTHEROPHAGUS OCHRACEUS Melsheimer.
Fig. 5. DIPTEROUS LARVA, allied to VOLUCELLA: 5a, side view.
Fig. 6. *Larva* of STYLOPS CHILDRENI Gray: 6a, side view.
Fig. 7. *Larva* of ANTHOPHORABIA MEGACHILIS Packard: 7a, *Pupa.*
Fig. 8. PTERATOMUS PUTNAMII Packard, side view: 8a, Fore wing.
Fig. 9. MITE from nest of *Bombus:* 9a, ventral view (enlarged).

VIII. *On Native Grapes.* By D. M. BALCH.

(Read December 26, 1864.)

It has been proved from numberless trials and disappointments extending over a long course of years, that the wine grape of Europe *(Vitis vinifera)* cannot be cultivated in the States east of the Rocky Mountains, with success, except under glass, both fruit and vine in open air culture, being sooner or later destroyed by disease, even in latitudes where the fruit would otherwise be perfected.

This much to be regretted failure is due neither to the cold of winter nor the heat and aridity of summer, but probably to the great and rapid fluctuations of temperature peculiar to these States; for on the Pacific coast where the climate is far more equable most European grapes flourish luxuriantly, and the bearing vines of California now number millions.

Such being the case we in the East must turn for our table fruit and wine to the various indigenous wild grapes, *(Vitis labrusca, æstivalis, &c.)* healthy and hardy plants, which grow spontaneously, varying in kind with the climate from Maine to Texas. The fruit of these wild vines is in most cases of the very worst quality, being acid, astringent and of a peculiar musky odour and taste, the so-called foxiness; but that horticultural skill and patience, by which have been elaborated from the common choke-pear all our well known varieties, approaching per-

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fection in quality and ripening throughout the entire year, is being applied to the wild grape, and the results of the few past years are astonishing. The goal of perfection in this case is still far distant, but we have many good and some excellent varieties; and the number of these is being yearly augmented, so that it is by no means improbable that many grapes, hitherto popular, will be gradually discarded as others of better quality or habit arise to fill their places: I refer to the Isabella, Catawba, Hartford, &c., in all of which there is large room for improvement.

To be of value as a table fruit or for wine a grape must contain a sufficient quantity of free acid, and sugar enough to temper, modify or partially disguise this acid, so that the juice shall not be flat and insipid but vinous and sparkling. In the case of table grapes the minor considerations of size, beauty, flavour, thin skin, deficiency of central pulp, etc, are of great importance, but the first point to be ascertained in a wine grape is the quantity of free acid and saccharine matter it is likely to produce in favourable circumstances.

To ascertain which (if any) of the native grapes ordinarily ripening in this vicinity, was best adapted to wine-making, I have this autumn analyzed the fresh must of many varieties. I had also another object in view, viz: to ascertain if the table adapted to Oechsle's must-scale by Gall, from numerous analyses of European musts in 1851, '52 and '53, were applicable to the must of our native grapes.

The method of analysis in all cases was as follows. The grapes were gathered when perfectly dry, pressed and the juice strained through linen. The specific gravity of this clear must was taken by weight in bottle with perforated stopper; a portion of must was diluted with 50 times its bulk of water and sugar contents ascertained by Fehling's method, (Annalen der Chemie und Pharm., Bd. 72. S. 106.); this method is very accurate if carefully performed: finally the free acid in a weighed portion was neutralized by a solution of caustic soda of such strength that 1 c. c, equalled .00825 grm. of Tartaric acid ($C_8 H_6 O_{12}$). All the free acid in must is not Tartaric, but in calculating

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results we can consider it so with small inaccuracy. The percentage results obtained are as follows :

Variety.	*Time of Gathering.*	*Sp. Gr.*	*Sugar.*	*Acid.*
Rogers' No. 15,	Sept. 5,		9.20	
" " "	" 26,	1.0783	16.47	.66
" " "	Oct. 5,	1.0839	*17.90	.70
Delaware,	" "	1.0896	19.70	.70
"	" "	1.1021	20.63	.65
Hartford Prolific,	Sept. 26,	1.0721	15.01	.43
Concord,	" "	1.0615	11.83	.86
Adirondac,	Oct. 5,	1.0714	14.00	.28
Allen's Hybrid,	" "	1.0780	*16.20	.59
Union Village,	" "	1.0556	*10.00	1.21
Rogers' No. 4,	Sept. 26,	1.0749	15.46	.61
" " "	Oct. 5,	1.0819	*17.30	.65
" No. 22,	Sept. 26,	1.0723	14.56	.76
" " "	Oct. 5,	1.0796	*16.70	.59
Clinton,	Sept. 26,	1.0688	13.77	2.40
Alvey (Hagar),	" 21,	1.0640	10.37	2.60
" "	Oct. 5,	1.0734	*14.70	2.02
Franklin,	Sept. 5,	———	8.77	———
"	" 21,	1.0610	11.20	2.16
Rogers' No. 3,	" 26,	1.0734	14.70	.66
" " "	Oct. 5,	1.0749	*15.30	.47
" " 19,	Sept. 26,	1.0680	13.65	.81
" " 1,	Oct. 5,	1.0665	12.60	.62
" " 9,	Sept. 21,	1.0680	13.41	.87
" " "	" 26,	1.0742	15.00	.57
" " 33,	" "	1.0572	11.70	1.01
" " 41,	" "	1.0749	15.63	.76
" " 30,	Oct. 5,	1.0630	*11.80	.84

The sugar percentage marked * in the table were not obtained by analysis, but are Dr. Gall's for the corresponding densities.

From these analyses native grapes would seem to be divided into three classes :—

1st. Those in which the proportions of acid and sugar are well balanced; as Delaware, Rogers' 4 and 15, Allen's Hybrid, &c. ; these grapes should yield good wine.

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2d. Those in which the acid is deficient; for instance, Adirondac, Hartford, &c.

3d. Those in which the great excess of acid overpowers all else and renders the fruit nearly uneatable; such are Clinton, Franklin, &c.

The analyses also prove that Dr. Gall's table for Oechsle's must scale can be safely used in finding the saccharine contents of native musts, the numbers obtained by analysis agreeing closely in most instances with the tabular amounts for corresponding densities.

To produce a wine that shall keep it is necessary that the must should contain at least 15 per cent. of sugar.

In Germany the must of the best grapes (Riesling) of the most favourable seasons contains 24—28 per cent. of sugar, .65 per cent. of free acids; this yields the most excellent wine, and is regarded as the normal standard with which inferior musts are compared and often made to resemble as far as possible by dilution and addition of sugar.

This method of bettering the must of partially ripened grapes, by which in bad seasons (total failures excepted) a wine can be made equal to the product of favourable seasons, is due to Dr. Ludwig Gall, who has published a treatise on the subject, an abridged translation of which may be found in the Patent Office Report, Agriculture, 1860.

To be of value for the production of wine, available for vineyard culture, a vine should be hardy enough to endure severe winters with slight protection; healthy and vigorous, so as to be little subject to the attacks of mildew, for it is very well known that a vine which has lost most of its foliage from this or any other cause cannot ripen its fruit. Injury from frost is little to be feared if the fruit be well ripened before its advent; the clusters should hang on the vine as long as the weather permits, and the ripest (better if slightly shrivelled) removed in three or four successive gatherings; they should be picked on a dry day and all defective berries removed. Many things influence early ripening, among which are soil, position, culture, variety and age of vine and crop adapted to its strength. The flavour of wine depends on the ripeness of the grapes and the proper proportion of free acids; this

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flavour is not present in the must but is developed during fermentation and the after-preservation of the wine.

It might appear that undue preference had been given in these analyses to the "Rogers' Hybrids"; this is simply owing to the fact that these grapes, arising from the union of the wild grape *(Vitis labrusca)* with the Black Hamburgh, and retaining some features of both, are more largely planted in this vicinity than other varieties, and are consequently more plenty in their season.

It has been asserted that these grapes are not true hybrids, but only seedlings of the "Mammoth Globe," and contain no foreign blood whatever. Such a conclusion is diametrically opposed to the horticultural experience of a century. For it is a well known fact that out of a large number, say five hundred chance seedlings of any fruit, but one or two at most will excel their parent; but these remarkable "seedlings," some forty in number, have not a bad grape among them, and are so far superior to the "Mammoth Globe" as to preclude all comparison. Their admixture of foreign blood is patent in the heavy clusters of fruit, so far pulpless as to yield 75—80 per cent. of juice, and the indigenous element recognizable in the health, hardiness and habit of the vine.

The chief value of analyses of grape-must lies in their repetition and comparison. The product of various seasons, climates and soils should be examined. If this is done we shall soon arrive at the grapes suitable for wine in different latitudes, and no doubt other important results. Those parts of the country lying on an Isotherm of 70°–72° for the growing months, June, July, August, and September, wherever the summer rains are not excessive, are best adapted to wine growing; for a mean temperature of at least 65° for the above months is required for the ripening of even the earliest and hardiest varieties of grapes. The average temperature of Salem and vicinity, as deduced from observations extending over 45 years, is about 66.5°, and several degrees above this can be gained in well cultivated and protected gardens.

The above analyses are imperfect, several prominent grapes having been omitted, but I hope to extend and improve the collection at some future time.

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IX. *Classification of Polyps: (Extract condensed from a Synopsis of the Polypi of the North Pacific Exploring Expedition, under Captains Ringgold and Rodgers, U. S. N.).* By A. E. VERRILL.

(Communicated February 29, 1865.)

The report upon the collection made by Dr. William Stimpson, naturalist to the expedition, having been much delayed, the following tabular view of the classification adopted is here presented, with the hope that, if imperfect like every other, it may, nevertheless, afford some aid in illustrating the natural affinities of these humble forms.

Although in a communication read before a Zoölogical Club at Cambridge, Jan. 1862, I attempted to demonstrate the existence of the three natural orders among polyps, I refrained from presenting this view in a paper published last year, in order that I might make further investigations upon the subject before finally publishing it.

CLASS CNIDARIA OR POLYPI.

ORDER I. MADREPORARIA.

Polyps simple or compound with embryonic or rudimentary basal or abactinal region, which has no special function unless for vegetative attachment while young. Actinal area well developed, form broadly expanded, having a tendency in the higher groups to become narrowed towards the mouth. Tentacles simple, conical. Dermal tissues, and usually the radiating lamellæ, depositing solid coral; the radiating plates being between the lamellæ, are, therefore, ambulacral and appear to originate from the surfaces of the lamellæ and the connective tissues extending across the ambulacral chambers and filling them from below. Interambulacral spaces distinct.

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Suborder I. Stauracea *(Madreporaria rugosa*)*.

Coral simple, or compound by budding; chiefly *epidermal* and *endothecal*; *septa* apparently in multiples of four, sometimes wanting. Type embryonic, like a young Astrea or Fungia.

Families,—*Stauridæ*, *Cyathophyllidæ*, *Cyathaxonidæ*, *Cystiphyllidæ*.

Suborder II. Fungacea.

Polyps either simple or compound by marginal or disk budding, rarely by fissiparity. Tentacles numerous, in multiples of six, imperfectly developed, scattered on the actinal surface, usually short and lobe-like. Upper part of polyps scarcely exsert. Coral broad and low, growth mostly centrifugal, tissue chiefly septal; walls imperfectly developed, often perforate, subordinate, usually forming the basal attachment.

Families,—*Cyclolitidæ*, *Lophoseridæ*, *Fungidæ*, *Merulinidæ*.

Suborder III. Astreacea.

Polyps mostly compound, either by fissiparity or various modes of budding. Tentacles usually well developed, long, subcylindrical, limited in number, in multiples of six

* This group is placed here with considerable hesitation and principally on account of the close resemblance in structure to the young of the succeeding and higher groups, when they first begin to form a coral, which then consists of a ring of epitheca or epidermal deposit with a few, imperfect, rugose septa radiating from the centre. If the number four be a constant feature of the arrangement of their septa, it is possible that they may be entitled to rank as a separate order of Polyps. To this opinion Prof. J. D. Dana inclines. Prof. Agassiz unites the group with Hydroid Acalephs on account of their resemblance, in some features, to the *Tabulata*. It seems to me, however, that the absence of transverse plates in *Cyathaxonidæ* and *Cystiphyllidæ* and the perfection of the vertical septa in *Stauridæ*, *Cyathaxonidæ* and some of the *Cyathophyllidæ*, together with their general structure, shows them to be more closely allied to the *Fungacea* and *Astreacea*, of which they may be considered embryonic types, while at the same time the group is a synthetic one, having analogies with nearly all the higher groups of Polyps and also in some respects, with Hydroids.

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encircling the disk. Coral mural, septal and endothecal; growth vertical and centrifugal, producing turbinated forms which are often elongated.

Families,—*Lithophyllidæ, Mœandrinidæ, Eusmillidæ, Caryophyllidæ, Stylinidæ, Astreinæ, Oculinidæ, Stylophoridæ.*

Suborder IV. Madreporacea (*Madreporaria perforata*).

Tentacles in definite numbers, twelve or more, well developed, encircling the narrowed disk, therefore nearer the mouth; polyps with the upper portion much exsert, flexile; growth chiefly vertical; coral mural and septal, porous. Polyps compound by budding, sometimes simple.

Families,—*Eupsammidæ, Gemmiporidæ, Poritidæ, Madreporidæ.*

ORDER II. ACTINARIA.

Polyps with well developed, often highly specialized, basal or abactinal region. Walls well developed, tentacles longer, more concentrated around the mouth, which is also, usually, if not always, furnished with special tentacular lobes or folds. Ambulacral spaces always open, destitute of connecting tissues and solid deposits.

Suborder I. Zoanthacea.

Polyps encrusting, adherent, budding from mural expansions; tentacles simple, short, at edge of disk.

Families,—*Zoanthidæ, Bergidæ.*

Suborder II. Antipathacea.

Polyps connected by a cœnenchyma, secreting a solid sclerobase or coral axis. Tentacles few, six to twenty-

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four, simple, conical.

Families,—*Antipathidæ, Gerardidæ.*

Suborder III. Actinacea.

Polyps free, capable of locomotion, with a highly specialized, muscular base or abactinal area. Tentacles well organized, either simple or branched, varying from ten to many hundreds, often with accessory organs arising from the same spheromeres, such as inner tentacles, verrucæ, complicated or simple branchial lobes, cinclidæ, eye-spherules, suckers, etc. Mouth with special lobes or folds. Most of the species are simple, a few are compound by fissiparity, many abnormally bud from the wall near the base, a few secrete from the base a horn-like deposit similar to the axis of Antipathes.

Families,—*Actinidæ, Thalassianthidæ, Minyidæ, Ilyanthidæ, Cerianthidæ.*

ORDER III. ALCYONARIA.

Polyps with well developed actinal, mural and abactinal regions, compound by budding. Tentacles eight, pinnately lobed, long, encircling a narrow disk. No interambulacral spaces. Ambulacral ones open and wide.

Suborder I. Alcyonacea.

Polyps turbinate at base, budding in various ways, encrusting, adherent to foreign bodies by the cœnenchyma.

Families,—*Alcyonidæ, Xenidæ, Cornularidæ, Tubiporidæ.*

Suborder II. Gorgonacea.

Polyps cylindrical, short, connected by a cœnenchyma, secreting a central supporting axis.

Families,—*Gorgonidæ, Plexauridæ, Primnoidæ, Gorgonellidæ, Isidæ, Corallidæ, Briaridæ.*

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Suborder III. Pennatualacea.

Polyps forming free, moving colonies, the composite basal portion with locomotive functions and special cavities, with or without a solid free axis.

Families,—*Pennatulidæ*, *Pavonaridæ*, *Veretillidæ*, *Renillidæ*.

Among the most interesting species in this collection the following may be mentioned:

Stephanoseris lamellosa Verrill.

Coral low, subcylindrical, with a broad base, which completely covers small univalve shells with the exception of the opening; wall rudimentary; septa in four cycles, the primaries much the largest with subentire rounded tops; columella well developed, papillose, costæ prominent, unequal.

Loo Choo Islands. Dr. Wm. Stimpson.

Heterocyathus alternata Verrill.

A low species with very unequal septa and costæ, the primary septa very prominent. Encrusts and covers small univalve shells.

Gaspar straits. Capt. John Rodgers.

Balanophyllia capensis Verrill.

A species about half an inch high, broadly attached, slightly turbinated, with an epitheca rising within a line of the margin. Calicle deep, broadly oval. Septa in four cycles, the principal ones much exsert, vertical, narrowed at top, those of the fourth cycle joining the columella in pairs. Color of the living polyp bright orange.

Cape of Good Hope. Dr. Wm. Stimpson.

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EUPSAMMIA STIMPSONII Verrill.

Coral free, elongated, turbinated, blunt at base. Calicle oval, deep; columella well developed, septa broad, the principal ones with entire inner edges, rounded. Length an inch or more; breadth of cell .30

Interesting as a living representative of a genus hitherto known only in the fossil state.

North China Sea. Dr. Wm. Stimpson.

METRIDIUM FIMBRIATUM Verrill.

A species closely allied to *M. marginatum* of this coast, but apparently more elongated, with longer and more slender tentacles which are almost hair-like. Disk within the tentacles narrow. "Color pale orange, translucent, body punctate with dark brown, mouth deep orange."

San Francisco, Cal. Dr. Wm. Stimpson.

PHELLIA COLLARIS Verrill.

Edwardsia collaris Stimpson, Proc. Philad. Acad. Nat. Science, May and June, 1855.

A species remarkable for its great size compared with previously known species from Europe.

Hong Kong, China. Dr. Wm. Stimpson.

PHELLIA CLAVATA Verrill.

Edwardsia clavata Stimpson, l. c. 1855.

A species even larger than the last.

Near Ousima, Japan. Dr. Wm. Stimpson.

AMMONACTIS nov. gen.

Column elongated, subcylindrical, with well developed basal disk, covered, as in *Phellia*, with a persistent epidermis extending to near the summit, naked above; but differs in having a lobe-like tubercle below each tentacle, distinct from the margin. Tentacles long and numerous.

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AMMONACTIS RUBRICOLLUM Verrill.

Edwardsia rubricollum Stimpson, l. c. 1855.

Hong Kong, China. Dr. Wm. Stimpson.

HALOCAMPA BREVICORNIS Verrill.

Edwardsia brevicornis Stimpson, l. c. 1855.

Hong Kong, China. Dr. Wm. Stimpson.

HALOCAMPA CAPENSIS Verrill.

Body elongated, tentacles twenty, blunt; ambulacra subpapilloso Six tentacles have their inner bases dark brown; body pale reddish with dots and patches of flake white; inner side of tentacles flake white.

Cape of Good Hope, 12 fathoms, sand. Dr. William Stimpson.

CERIANTHUS ORIENTALIS Verrill.

A large species similar to *C. americana* nobis. Body elongated, in a tube of mud. Tentacles long and slender. Color of body deep reddish brown, outer tentacles translucent, yellowish and white, pale brown on their inner sides, greenish at base; inner ones purplish brown or sometimes grass green.

At low water mark, Hong Kong, China. Dr. William Stimpson.

NEPHTHYA THYRSOIDEA Verrill.

Polyps forming thyrsiform bunches of closely clustered branchlets, three inches high and two broad. Color wine-yellow or light brown, with a dark purplish tinge below the tentacles; tentacles nearly white; spicula forming elevated, transverse lines of silvery white on the stalks.

Cape of Good Hope, 20 fathoms, rocks. Dr. Wm. Stimpson.

TELESTO RAMICULOSA Verrill.

Cornularia aurantiaca Stimpson, l. c. 1855, non. *T. aurantiaca* Lamx.

Hong Kong, 10 fathoms, shelly bottom. Dr. Wm. Stimpson.

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PARISIS LAXA Verrill.

Coral forming openly reticulate fronds; papillæ numerous rounded, on all sides of the branches; cœnenchyma minutely villous in alcohol. Calcareous joints shorter and internodes longer than in *P. fruticosa* nobis.

Hong Kong. Dr. Wm. Stimpson.

ACANTHOGORGIA COCCINEA Verrill.

Nepthya coccinea Stimpson, l. c. 1855.

Hong Kong, 10 fathoms, on shells. Dr. Wm. Stimpson.

VERETILLUM STIMPSONII Verrill.

A large species six or eight inches long, the upper portion enlarged, more than half the entire length. Polyps much exsert, upwards of an inch long; tentacles very long. Axis thick, short, fusiform, a third of an inch long. Base white, somewhat striated; body light cream-color; polyps transparent, bluish white at the bases of the tentacles.

Hong Kong, 6—10 fathoms, mud. Dr. Wm. Stimpson.

VERETILLUM BACULATUM Verrill.

Club-shaped, the base about a third of the length. Polyps scattered, not numerous. Axis small, fusiform, about half an inch long in a specimen three inches long.

Sea of Ochotsk, off Siberia. L. M. Squires.

KOPHOBELEMNON CLAVATUM Verrill.

Veretillum clavatum Stimpson, l. c. 1855.

Polyps more numerous and crowded than in *K. Burgeri* Herkl. which it resembles; body more claviform, naked dorsal space very narrow.

Hong Kong, 6 fathoms, mud. Dr. Wm Stimpson.

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X. *Notes on the Habits and Distribution of the Duck Hawk, or American Peregrine Falcon, in the Breeding Season, and Description of the Eggs.* By J. A. ALLEN.

(*Communicated November* 14, 1864).

The Duck Hawk, Great-footed Hawk or American Peregrine Falcon, (*Falco anatum* Bonap. *Falco peregrinus* Wilson, Audubon and Nuttall), has not long been known to breed within the limits of the United States. Dr. T. M. Brewer, in the "North American Oölogy," (part I, page 8,) published in 1857, says that but one authenticated instance has come to his knowledge of its having been met with, in the breeding season, south of Newfoundland. This was near Columbia, in Pennsylvania, where the young that had fallen from the nest had been procured by Prof. S. S. Haldeman; but the eggs had not been discovered, nor many particulars learned beyond the fact of its breeding there. In a note on this subject from Prof. Haldeman to Dr. Brewer, published in Dr. Brewer's account of this species, Prof. Haldeman says: "A pair [of these hawks] had a nest for many years about a hundred yards from my house, on a high and almost vertical cliff; but as a railroad now traverses its base, it is not probable that the species will return to the locality. * * * * The nest was difficult of access, and I never saw it; but it was once reached, and the young taken by getting down from above." Prof. Haldeman also states that he felt confident they bred among the cliffs at Harper's Ferry, as he had seen them flying about there.

It has recently been ascertained that the Duck Hawk regularly breeds on several of the mountains in and near the Connecticut River Valley, the young having been procured from Mount Tom and Sugar Loaf Mountain in Massachusetts, and from Talcott Mountain, ten miles west of Hartford, in Connecticut. From accounts that I have received from different persons of a hawk agreeing in habits with the noted Duck Hawk, I am fully satisfied it has long nested on some of the precipitous mountains bordering on the Connecticut River in the States of Vermont and New Hampshire. Mr. J. G. Boardman says it

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breeds on the cliffs of Grand Menan, where it is resident the whole year.* Although the young have been procured, as above stated, from Mount Tom and Sugar Loaf Mountain several times in the last few years, and according to Dr. W. Wood, also from Talcott Mountain†, I am not aware that the eggs have been found in New England, or even in the United States, before the present season, when they were procured from a nest on Mount Tom, (April 19th, 1864) by Mr. C. W. Bennett‡. The only egg figured by Dr. Brewer was from Greenland, and its authenticity not ascertained wholly beyond doubt. Dr. Brewer mentions a drawing in his posession, by Dr. Trudeau, of another egg from Labrador; these being the only specimens to which he then had access.

In fall, winter and spring, this Falcon is not unfrequent along our Eastern sea coast, wherever its favorite prey, the sea ducks and other marine birds, abounds, but it is not at that season very commonly distributed over the country. Although it has been found throughout Eastern North America, chiefly near rivers, from Greenland to Cuba, and as far westward as the mouth of the Vermillion River, on the Upper Missouri§, but little definite information has yet come to ornithologists of its distribution and habits in the breeding season. Hitherto it has generally been supposed to retire to regions north of the United States to spend the summer and rear its young‖; and though many do so, quite a proportion, it is evident, are resident in the northern parts of the United States the whole year, retiring to inaccessible cliffs for the purpose of breeding, and thus generally escaping the notice of naturalists during that important season. Poultry yards that chance to be in the vicinity of its nests are so frequently visited for plunder by this daring

*Proc. Bost. Soc. N. H., Vol. IX, p, 122, (Sept., 1862).

†Hartford, (Conn.) Times, June 24, 1861.

‡The writer is indebted to the kindness of Mr. Caleb W. Bennett, of Springfield, Mass., for the specimens and many important facts which form the basis of the present article. Great credit is due Mr. Bennett for the persevering efforts he has made to discover and procure the eggs of the Duck Hawk; his complete success has not been unmerited.

§P. R. R. Ex. and Surv. Vol. IX. p. 7.

‖Aubudon found it breeding quite plentifully along the high rocky shores of Labrador and Newfoundland.

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species, that it is well known to many of our farmers and sportsmen, who readily distinguish it from other hawks by its bold dashing flight, and peculiar manner of capturing its prey; and its nests, I learn, are sometimes found by them, and the young destroyed.

All accounts agree that they nest in almost inaccessible cliffs; and often the nest can only be approached by a person being let down by a rope from above. The old birds are represented as bold in the defence of their nest, approaching so near as generally to be easily shot. They arrive early at their nesting place, and though they often bestow no labor in the construction of a nest, beyond the scraping of a slight hollow in the ground, they defend their chosen eyrie for weeks before the eggs are laid, and are known to return for several years to the same site. Incubation commences very early, the young having been found in the nest at Mount Tom May 30th, nearly fledged*, and on Talcott Mountain in the same condition June 1st, so that the laying of the eggs must occur by the last of March, or very early in April. The number of eggs has been known in several instances to be four.

Mountains Tom and Holyoke, in Massachusetts, afford several localities favorable for the nidification of the Duck Hawk, and sometimes several pairs, and probably usually more than one, breed about these mountains†; about the last of May, 1863, Mr. Bennett saw five adult birds of this species about Mount Tom. Dr. W. Wood of East Windsor Hill, Ct., informs me, that two pairs of Duck Hawks were evidently breeding on Talcott Mountain in the summer of 1863.

Discovery of the eggs on Mount Tom. Although the Duck Hawk has been long known to breed at the localities in Massachusetts mentioned above, those conversant with the fact were not aware that any special interest was

*According to R. B. Hildreth, Esq., of Springfield who visited this nest May 30th, 1861, and noted the fact. The nest on Talcott Mountain, Ct., was found the same season, and first visited only a few days later—about June 1st, 1861. (See Hartford Times, as quoted above).

† Since the above was written I have been informed by Mr. Bennett, that a pair of these Hawks actually raised their young on Mount Tom, in the summer of 1864, notwithstanding one pair was broken up the same season.

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attached to it, or that its eggs and breeding habits were but very little known to ornithologists; and so, until very recently, no particular efforts have been made to obtain the eggs. Mr. Bennett, becoming aware of this, resolved to procure the eggs. He accordingly visited Mount Tom for this purpose April 7th of the present year, when he searched the whole ridge of the mountain, discovered the old birds and the particular part they most frequented, and also the site of a nest, where young had been raised. The old birds were continually near this spot, and manifested much solicitude when it was approached, often flying within six or eight rods, and once the female came within three, screaming and thrusting out her talons with an expression of great rage and fierceness. The birds did not appear at all shy, being easily approached quite near to, though in walking the cracking of sticks and the clinking of the splinters of trap rock made no little noise. One of the birds appeared to keep close to the eyrie, and both would approach whenever it was visited, screaming at and menacing the intruder, notwithstanding that at that time there were no eggs, as was afterwards proved. Mr. Bennett suspecting that incubation had already commenced visited the locality again on the 9th, but only saw the old nest, the birds behaving as before. On April 19th, ten days later, he made another visit, and creeping carefully to the summit of the cliff, at a point near the eyrie already spoken of, he saw the female, on looking over the cliff, sitting on the nest, and but five or six yards distant. She eyed him fiercely for an instant, and then scrambling from the nest to the edge of the narrow shelf supporting it launched into the air; in a twinkling Mr. Bennett's unerring aim sent her tumbling dead at the foot of the precipice, several hundred feet below. The nest contained four eggs, which were soon safely secured, and the body of the female was obtained from the foot of the cliff. The male soon coming about, was shot at, but he was too shy to come within range, except once, while the gun was being reloaded. The eggs were all laid after Mr. Bennett's visit April 9th, and their contents showed, April 19th, that they had been incubated but a day or two. Incubation seems in this case, to have commenced several weeks

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later than usual, which may be owing to the late snows and unusual coldness of the weather this year during the first half of April.

Location and Description of the Eyrie. The situation of the eyrie was near the highest part of the mountain, about one-third of the length of the mountian from the south end, on a narrow shelf in the rock, eight or ten feet from the top of a nearly perpendicular cliff, one hundred and fifty or two hundred feet in height, and was inaccessable except to a bold climber, and at one particular point. The nest was merely a slight excavation sufficient to contain the eggs; no accessary material had been added. The site had been previously occupied, and probably for several years; and for weeks before the eggs were laid was carefully guarded by the bold and watchful birds.

Description of the eggs. The eggs, four in number, as already stated, differ greatly both in shape and coloring, the extremes in either being widely diverse. They are described in detail, and probably in the same order as laid.

No. 1. Longer diameter, 2.18 inches; shorter diameter 1.71 inches; the shorter diameter is .885 the longer. The form is somewhat ovoid, one end being slightly larger than the other; but neither end is very pointed; the point of greatest transverse diameter is .645 the length of egg from the smallest end. In form this egg is very nearly like the egg from Greenland, figured by Dr. Brewer in the "North American Oölogy" (pt. I, pl. II, fig. 11) The general color is chocolate-brown, darker and more dense and uniform about the ends, the part about the middle being lighter, varied with small irregular blotches and specks of a darker tint than the ground color. The color of the smaller end is nearly a uniform dull red-ocher. There is also an irregular belt of scattered and apparently very superficial blotches of very dark-brown, or nearly black. Something similar is often noticed on the eggs of many birds that lay brown or speckled eggs.

No. 2. Longer diameter 2.21 inches; shorter diameter 1.67 inches; shorter diameter .755 the longer. Form nearly an ellipsoid, the point of greatest transverse diameter being scarcely to one side of the middle (.54 the length of the egg from the smaller end): ends very nearly equal

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and not very pointed. The distribution of the color in this is nearest of any of the four eggs before me to that figured by Dr. Brewer and only differs from it in tint. One end (the smaller ?) is very light-reddish, or reddish-white, becoming lighter from the middle towards this end, about which it is the lightest and thinly marked with irregular mottlings of dark reddish-chocolate, which present a very superficial grayish tinge that is very characteristic; the other end (the larger?) is of a uniform dark ferruginous-brown or dull red-ochre, varied towards the middle by the appearance of the light ground color between the there scarcely confluent blotches of dark-brown that give the uniform deep tint towards and about this end.

No. 3. Longer diameter 2.32 inches; shorter diameter 1.70 inches; shorter diameter .733 the longer. Form ovoid, the smaller end elongated and much pointed. This egg is the longest, and much larger in proportion to its diameter than either of the others. The point of greatest diameter is .656 the length of the egg from the smaller end. In this specimen the contrast between the ground color and the markings becomes very strong, the ground color which is seen chiefly in a broad band about the middle of the egg, being white or reddish-white, and the markings very dark reddish-brown nearly approaching purple, and are quite uniformly distributed in blotches of various sizes, the largest being near the larger end of the egg; the sub-markings are of a lighter reddish-brown and are more blended.

No. 4. Longer diameter 2.16 inches; shorter diameter 1.65 inches; shorter diameter .765 the longer. Form regular ovoid, the smaller end rather more pointed than the same in No. 1; point of greatest transverse diameter .60 the length of the egg from the smaller end. In this specimen the contrast of the ground color with the markings is very striking, especially when compared with specimens No. 1 and No. 2; and the most peculiar part is that the greater end of the egg, which in the eggs of most birds is the end usually most subject to markings and to the greatest depth of color, is white, sprinkled sparingly with reddish specks, while the smaller end is deep, bright, brick-red, here and there relieved by small specks and patches

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of white ground color. About the middle of the egg the colors are in more equal proportions, the white patches becoming larger on the smaller end towards the middle, and the red patches on the larger end increase towards the same point, where the colors meet and become mixed in irregular patches of various sizes, from mere dots to blotches. The smaller end has a few streaks and blotches of dark-purple overlying apparently the other colors, as in specimen No. 1.

These specimens are very interesting, as indicating the great amount of variation to which the American Peregrine's eggs are subject, and especially so since they are all the product of one pair of birds, laid in one set, and identified as such beyond question. In coloration a transition can be traced between the extreme in the order they are numbered, which is undoubtedly the order in which they were laid, as indicated by the thickness of the shell as well as by the depth of color.

Table of Comparative Measurements.

	L'gth.	Breadth.	Prop of breadth to length.	Point of greatest transverse diameter from small end.
No. 1	2.18 in.	1.71 in.	0.785	0.640 l'gth of the egg
" 2	2.21 "	1.67 "	0.756	0.540 "
" 3	2.32 "	1.70 "	0.732	0.656 "
" 4	2.16 "	1.65 "	0.765	0.600 "
Average	2.22 "	1.68 "	0.759	0.609 "
Greater extr.	2.32 "	1.71 "	0.785	0.656 "
Lesser extr.	2.16 "	1.65 "	0.732	0.540 "
Am't of variation	0,16 "	0.06 "	0.053	0.116 "
Dr. Brewer's spec.	2.00 "	1.56 "	0.780	

From the above table it will be seen that the range of variation in the four specimens in length is .16 of an inch; or nearly seven and half per cent. of the average length; in breadth .06 of an inch, or about three and a half per cent. of the average breadth; in the proportion of breadth to length, about fifteen per cent. of the length, or nearly twenty per cent. of the average proportion; the variation in the position of the point of greatest tranverse diameter is about eleven and a half per cent. of the whole length of the egg, the form of the eggs varying from an ellipsoid in No. 2 to an ovoid, which in No. 3 has the

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smaller end considerably elongated. It will be observed that the egg measured by Dr. Brewer is considerably smaller than my smallest specimen, and that the proportion of breadth to length scarcely differs from the same proportion in No. 1.

In comparing the eggs of the American and the European Peregrine Falcons, Dr. Brewer, observes: "It [the American] closely resembles a variety of the eggs of the European species, but seems to present differences sufficiently well marked to be regarded as specific. * * * * The ground colors of both American and European are a reddish-yellow, and both are thickly covered with fine dottings of chocolate and ferruginous-brown, diffused over the whole egg, in nearly equal degree, and to such an extent as nearly to conceal the ground. The length of the American egg is slightly less, but it is of equal or greater capacity, and varies in its markings from all the European specimens that I have ever met with. These variations, though readily traceable by the eye, are not so easily described. The shades of coloring in both are closely alike; the variation consists more in the distribution of these markings. In the European specimens, the fine markings of chocolate are distributed with nearly exact uniformity. In the American, the secondary colorings are now more thickly and now more thinly diffused, here leaving the ground color nearly unchanged, there becoming confluent and blending into waving lines, blotches and bold dashes. The egg in consequence, presents a more varied appearance. These markings are also in greater proportion around the larger end of the egg, and the blotches are of a deeper shade, so there is a variation in the shading between the smaller and larger extremities not noticeable in any European egg that I have met with."

The amount of variation presented by the eggs of the Duck Hawk described above, shows that but little dependence can be placed on the eggs in deciding specific differences. The eggs mentioned by Dr. Brewer, are not much different from those of the true European Peregrine. One or two of the specimens before me considerably resemble Dr. Brewer's, and likewise eggs of the European species as figured and described by authors, while the others are very different, one being remarkably so.

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The eggs of the different species of this group of Falcons seem to resemble each other greatly, and to be subject to considerable variation in the same species. In the manner of laying the eggs there is also a similarity, as might be expected among closely allied species; the same species sometimes laying them on the bare rocks, and again in a bulky nest of sticks and other coarse materials. The nest of this species visited on Talcott Mountain, Ct., was of the latter kind, while on Mount Holyoke the eggs were laid on the bare earth.

Audubon thus describes the nest and eggs of the Duck Hawk as observed by him at Labrador:

"I have nowhere seen it so abundant as along the high, rocky shores of Labrador and Newfoundland, where I procured several adult individuals of both sexes as well as some eggs and young. The nests were placed on the shelves of rocks, a few feet from the top, and were flat and rudely constructed of sticks and moss. In some were found four eggs, in others only two, and in one five. In one nest only a single young bird was found. The eggs vary considerably in color and size, which I think is owing to a difference of age in the females, the eggs of young birds being smaller. The average length of four was two inches, their breadth one and five-eighths. They are somewhat rounded, though larger at one end than the other; their general and most common color is a reddish or rusty yellowish brown, spotted and confusedly marked with darker tints of the same, here and there intermixed with lighter. The young are at first thickly covered with soft white down. * * * * In several instances, we found these Falcons breeding on the same ledge with Cormorants, *Phalacrocorax carbo*."*

Audubon adds that he is perfectly convinced that the Great-footed Falcon, or Duck Hawk of the later ornithologists is not different from the Peregrine Falcon of Europe. "Since my first acquaintance with this species," he says, "I have observed nothing in its habits, form, or marking on one continent that is different from what is found on the other." Since the difference in breeding habits supposed to exist when Bonaparte separated them in 1838, and which influenced his judgment in the matter, has been found to be not real, there seems to be nothing whatever in the breeding habits or in the appearance of the eggs to indicate specific difference between the American and European birds.

Springfield, July, 1864.

*Orn. Biog., vol. V., p. 366.

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XI. *A Classification of Mollusca, based on the "Principle of Cephalization."* By EDWARD S. MORSE.

With a Plate.

[Communicated June 19, 1865.]

After becoming acquainted with the perfect unity of plan in the Radiata and the connected series of homologies, running through the whole branch, (as demonstrated by Prof. Agassiz in his private lectures) my interest was excited, to discover, if possible, a like symmetry of development in the Mollusca. Finding the universality of vertebration among the Vertebrata, of articulation among the Articulata, and similarly of radiation among the Radiata, I could not but believe that in the Mollusca some plan lay hidden, which, when unfolded, would as definitely convey their type, and unite them all, as in the other branches. It is not enough to call them soft bodied animals; for in considering their shell as a part of their organization, we have among them many of the hardest animals known, and we also have an equal number of soft bodied animals in the other branches. Their bilaterality, as expressing anything definite, is an equally unsatisfactory character. Prof. Huxley has given an archetype, or common plan of the Mollusca, as he conceives it, with many truthful homologies, in the article "Mollusca," English Cyclopedia, Vol. III., p. 855. In his figure of the archetype however, which is bilaterally symmetrical, we have details of structure only.

Prof. Agassiz in his "Methods of Study in Natural History" also suggests his idea of the plan, or structure, when he says, p. 34, "Right and left, have the preponderance over the other diameters of the body," and says furthermore, that collectors unconsciously recognize this in the arrangement of their collections. "They instinctively give them the position best calculated to display their distinctive characteristics, and to accomplish this they necessarily place them in such a manner as to show their sides." This can refer only to the Lamellibranchs, and their shells are displayed on the sides, because they naturally fall in that position. This lateral preponderance of structure only obtains among the Lamellibranchs. All Brachiopods

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are displayed from the dorsal or ventral valve. Also the Gasteropods, particularly the flat forms like Patella, Chiton, etc. and the Nudibranchs as well, while in the figures of the naked Cephalopods we most usually have a dorsal view.

Though Prof. Agassiz speaks of radiation as characterizing the Radiates, and similarly of articulation and vertebration as characterizing the Articulates and Vertebrates, yet Mollusks are spoken of as first introducing the character of bilaterality, or division of parts along a longitudinal axis, that prevails throughout the Animal Kingdom, with the exception of the Radiates. This then can be no restricted definition for the Mollusca, since it pervades the two higher branches; and who will deny the evidence of bilaterality among the Radiates, the higher Echinoderms for instance, as Clypeastroids and Spatangoids, where we have as good a definition of a longitudinal axis, as we obtain in many Mollusks. Even among the Polyps, as in the Actinaria, the antero-posterior axis is clearly expressed in the undue prominence of the primary radii.

Prof. Dana has been the first to publicly announce the plan of Mollusca, when he says, "The structure essentially a soft, fleshy bag, containing the stomach and viscera, without a radiate structure, and without articulations."*

As far back as 1855 he has presented this thought in his lectures at Yale College.

In the year 1862 Mr. Alpheus Hyatt had independently worked out a similar result, and has already in MSS. notes, the necessary data demonstrating the same.†

Mr. Hyatt also proposes the name Saccata as more fully and truthfully expressing the type, than the unmeaning word Mollusca. This name not only expresses the Plan, but is equivalent to the titles Vertebrata, Articulata, and Radiata, and is in no way a qualitative appellation.

*Dana's Manual of Geology, p. 148.

†Mr. Hyatt has relinquished all ideas of publishing on this subject, since becoming aware that I was to do the same. During the preparation of these pages, I enjoyed his companionship, and many of the points herein stated, were fully and freely discussed between us, and to him I am indebted not only for the privilege of announcing his proposed name, Saccata, but for the suggestion of certain points to be hereinafter mentioned.

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Objecting as all must to the introduction of a new name, still one so appropriate as that proposed by Mr. Hyatt, in lieu of one that has no relation to the Branch, except its traditional use, is certainly worthy of consideration, as it so clearly indicates what is believed to be the fundamental idea in the Branch, that of the Sac.

It might be said, in one sense of the word, that all animals are bags, or sacs, in various degrees of development. And if we mistake not, Prof. Pierce of Harvard University has expressed this idea, modified by saying that one is a radiate sac, another a simple sac, another an articulate sac, and finally a vertebrate sac, or a sac having two compartments. Viewing the Radiates as degradational, in relation to the higher animals, or partaking a plant-like character, we may justly be allowed to remark, that the Mollusks, as a type, present the sac feature most completely, for nowhere (with few exceptions, e. g. Cirripeds), do we find the various organs so essentially concealed, or possessing the power of retraction within a sac, as in the Mollusca. And that this is the leading feature in Mollusca might properly be inferred from the following; that in the four prominent branches of the Animal Kingdom, we have sketched out, in the incipient stages of the embryo, or at least, in its first indications of permanent characters, its typical features.

Thus, in the vertebrate ovum, after segmentation, we have the area pellucida, and primitive trace as indicating the future region, and direction of the vertebrate column. Among the Articulates, we have the transverse division of the embryo: and certainly the most prominent feature in the Molluscan embryo is the sac or mantle; as in the Gasteropods, where we not only have in the embryo a mantle developed, but a distinct nautoloid shell, from which the little animal thrusts himself. In Cephalopods also, as Kölliker has shown in the development of Sepia officinalis, the mantle, or sac, is the first figure traced on the germ mass.

In my search after homologies between the different groups in this Branch, I always met with difficulty in the relations of the classes;—and though many of the views to be presented, I had long ago worked out, and had consid-

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ered, and tested them, by personal examinations of the animals, it was not till I comprehended the importance of the sac character, and understood the "Principles of Cephalization" first enunciated by Prof. Dana, that I was enabled to clear up previous doubts, discover new relations, and, as I believe, rightly interpret the relations of the classes.

"As the principle of Cephalization is involved in the very foundation of the diverse forms that make up the animal kingdom, we may look to it for authoritative guidance, with reference to the system that prevails among these forms."*

In the following considerations, all preconceived ideas regarding the relative positions of the dorso-ventral, and antero-posterior diameters of the animal must be laid aside, and the essential structure of the animal if rightly understood, must be our guide. The gradual morphological changes of the contents of the sac, and all other relations, are based on the principle of Cephalization. In the plate presented (Series I) I have given a typical figure of the six prominent groups of the Saccata; namely, Polyzoa, Brachiopoda, Tunicata, Lamellibranchiata, Gasteropoda, and Cephalopoda.

For obvious reasons, only the intestine, head, and pedal ganglia within the sac are represented. These six figures are placed in their normal position, anterior pole downward, the dorsal region is turned to the left. Commencing with the Polyzoa (Series I, P) we have the sac closed, while the mouth and anus terminate close together at the posterior pole of the sac; the mouth occupying the extreme posterior position, and by a dorsal bend of the intestine upon itself, terminating dorsally. The nerve mass is found between the oral and anal openings. In this class the mouth and anus have the power of protrusion from the sac. In the three lower orders, Cyclostomata, Ctenostomata, and Cheilostomata, the polyzoon, when completely evaginated, presents no fold or inversion of the sac, while in the higher group Phylactolæmata, there is a partial and permanent inversion of the sac under like conditions.

* "Classification of animals based on the principle of Cephalization." Dana, Amer. Jour. Sci., Second Series, Vol. XXXVI., p. 321.

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This latter group, combining the permanent inversion of the sac-walls with the lophophoric arms, is the first approach to the Brachiopoda. No organ corresponding to a heart has yet been discovered. In the Brachiopoda (Series I, B) we have a permanent invagination of the sac, and the mouth, as in Terebratula, already occupies a position some distance from the posterior edges of the overlapping shells, and the brachial coils permanently occupy the space thus made.*

We have in this group a dorsal flexure of the intestine, and a tendency to terminate as in the Polyzoa. In Lingula it terminates posteriorly and at one side. By the permanent inversion of the sac, the mouth makes a great advance toward the anterior pole. In Terebratula, Waldheimia, and allied genera, where the sac is very short and swollen, and the brachial coils very large, the viscera are crushed to the front, and the intestine, which is short and simple, is nearly bent upon itself, though still occupying a median line. In Lingula, where we have a very long and flat sac, the intestine is long, and has ample room for convolutions, but the anus, instead of terminating in a line with the mouth, is thrown to one side, in consequence of this excessive flatness of the sac. The heart will be found on the outer bend of the intestine and actually on the ventral side; the nerve occupying its homological position.

(The manner in which I view the Brachiopoda, if true, will entirely reverse the accepted poles of their structure. What has been considered as dorsal, is here regarded as ventral, and what has been considered as anterior, is here regarded as posterior. Further remarks on this will be made hereafter).

Thus far the balance of structure has been thrown to the posterior pole of the sac, and though we see a cephalization, or concentration of the muscular system and viscera, toward the anterior pole in Brachiopoda, yet that pole being essentially closed, we have no function manifested at that end, except the degradational one of adhesion. In

* "Terebratulina caput-serpentes, and Crania anomala, projected their cirri beyond the margin of the open valves, and moved them as the Polyzoa move their oral tentacles, but in no instance were the arms extended." Woodward's Treatise, p. 466.

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the Tunicata (Series I, T) we have, through continued cephalization, the mouth thrown to the bottom of the sac, or nearer the anterior end, and now the anus terminates behind the mouth, and posteriorly.

The heart has also followed the intestine in its rotation and becomes anterior, and partially dorsal. The nerve mass is still posterior, and occupies a position between the two openings as in Polyzoa.

We have commencing in this group, the Tunicata, that erratic bending of intestine, and varied position in its anal termination, that is witnessed higher up in the scale, and though apparently governed by no law, we can yet trace the progressive movements toward a normal condition, by comparing Appendicularia, one of the lowest forms of the Tunicates, and representing the larval condition of their class. In this form the intestine has a ventral flexure, and terminates on the ventral side. In Pyrosoma it makes an abrupt bend toward the anterior dorsal region, and terminates anteriorly. In Salpa it terminates dorsally, on a line with the mouth, though still anteriorly. In Botryllus it creeps up, and terminates nearer the posterior pole of sac, though still dorsally. We have in this genus, and other compound Ascidians, the excurrent orifices of several individuals coalescing, forming a common cloaca for a community. The dorsal flexure is distinctly seen in Clavellina borealis. In these three classes; namely, Polyzoa, Brachiopoda, and Tunicata, the sac is essentially closed at the anterior end, and consequently the mouth opens toward the posterior end, and with few exceptions all are attached by the anterior end.

This makes a natural division, corresponding to the Molluscoidea of Milne-Edwards, the Anthoid Mollusks of Dana, and a portion of the neural division of Huxley. In the Lamellibranchiata (Series I, L) we have the sac opening anteriorly, and the mouth permanently occupying the anterior region, though in the lower forms pointing posteriorly, and in all cases the tentacular lobes pointing in that direction, and the mouth bent downward (ventrally), and partially obstructed by the anterior adductor, or by the undivided mantle. The gradual enlargement of the anterior opening is clearly seen, where in the Gastrochœ-

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nidæ, we have first a minute orifice, for the passage of an immature foot, or metapodium; this opening gradually enlarging in different genera, until in the Unionidæ we have the sac almost completely separated, except dorsally. It will be noticed that the anterior opening is also ventral, or nearly so in the lower forms. In Gasteropoda (Series I, G) the posterior end of the sac becomes essentially closed, and the ambient fluid now finds access to the gills through the anterior (though partially ventral) portion of sac, while with Cephalopoda (Series I, C) the opening is all anterior. Thus far we have traced the gradual cephalization of the contents of the sac, and of the sac itself. The dotted lines X X, running through the oral opening of each figure in Series I of Plate, show the gradual advance of this opening from the lower to the higher classes. In the lowest class all the display of structure, with the oral and anal openings, lies at the posterior pole of sac. In this highest class, all this display of structure lies at the anterior pole. Advancing from the Polyzoa, by the gradual advance of the mouth, the posterior pole becomes less prominent. Even when the sac opens anteriorly as in the Lamellibranchiata, the posterior end of sac remains open, and the mouth, partially inclined that way, receives its food from that end; the food being conducted to the mouth by ciliary motion as in the three lower classes. The nature of their food is also identical, being of an infusorial character, and as such it is obvious that masticating organs, or biting plates, such as we find in the two higher classes, are not needed.

So long also as the posterior end of the sac remains open, the anus terminates at that end; when this opening becomes closed, as in the higher classes, the anus seeks an outlet through the anterior opening, and the mouth, that before received its food from the posterior end of the sac, and by ciliary motion, now distinctly points the opposite way, and is furnished with the proper organs to procure food, the nature of which requires separation and trituration.

In nearly all the foregoing homologies, and also the position in which I place the Tunicate sac, I am sustained by the writings of eminent naturalists. With the Brachiopoda, however, my views completely reverse the accepted

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poles of the body, though, even here, according to "Woodward's Treatise on Mollusca," page 204, Forskahl and Lamarck "compared *Hyalea* with *Terebratula;* but they made the ventral plate of one answer to the dorsal valve of the other, and the anterior cephalic orifice of the pteropodous shell correspond to the *posterior*, byssal foramen of the bivalve!" And, if the views I advance prove correct, they were precisely right. In all my previous attempts to homologize the different classes, I had always met with an obstacle in the apparently aberrant characters of the Brachiopods: never for a moment doubting the truth of the accepted views, that indicated the regions to be called dorsal and ventral, as such, I labored in vain. When I undertook to interpret the relation of these classes on the principle of cephalization, I found that these accepted views must be doubted, and it was with amazement that I beheld such unlooked for results: that the so-called anterior pole is really the posterior pole, and that the so-called dorsal region is really the ventral region.

It has not been without patient consideration that I now advance these views, knowing that by many they will be received with opposition; nevertheless, the more I try to make them comformable with already received relations, the more I am convinced that such relations are wrong; and it is only in believing that continued research will but confirm these propositions, that I now dare to offer them.

According to the views here advanced, the Brachiopods are attached by a prolongation from the *dorsal* area, as in the lower Polyzoa, where they lie on the back. That in their natural position in life, this valve is really uppermost. That the process of attachment also proceeds from the anterior pole of the body, as in all the members of the Branch even to Gasteropods, with the exception of those attached by one valve, (e. g. Ostreans, Clavagella,) whether it be by a byssus, confined in cells of their own making, or buried in the mud, it is the anterior end which is fixed. In several lower forms, like Tridacna and Anomia, the point of attachment springs from the dorsal area, as in the two lowest classes. In regard to the posterior position of the mouth in Polyzoa and Brachiopoda, we have similar anal-

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ogies among the Articulata; Cirripedia, for example, where we have animals becoming attached head downward, and all the oral parts, as in the pedunculated forms, tending towards the posterior pole of the body; or in Limulus, where we have such a decephalization as it were, the mouth occupies nearly a central position in the ventral region.

Again, considering the intestine as a simple tube, opening at each end, with the weight of structure evenly divided between the two openings, is it any more incredulous, that the oral opening should be posterior, than that the anal opening should be anterior, as in the Gasteropods?

In Polyzoa, the oral and anal openings occupy a similar position in all the forms. In Brachiopods, while the mouth remains in nearly a constant position, the anus terminates either in a median line, or by a lateral deflection of intestine to one side. In Tunicata, while the mouth occupies a permanent position at the front of the sac, the anus terminates at various portions of the sac, generally in a median line, though there is usually a lateral deflection of the intestine.

In Lamellibranchiata, the mouth and anus terminate in a median line, with few exceptions, (e. g. Pecten) though the intestine convolutes in various ways. In Gasteropods we have again lateral deflection of intestine, and though in many genera the anus terminates in a median line, yet in the bulk of the Gasteropods it terminates at one side or the other. In the Dibranchiate Cephalopods we have again the termination of the intestine in a median line.

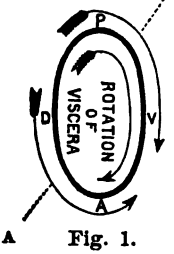

Fig. 1.

o The diagram here given (Fig. 1) represents an ideal longitudinal section of the sac, similar to those of Series I. The arrow within the sac, shows the direction of rotation of the bent intestine, carrying with it the heart, (see Plate, Series I.) which in Brachiopoda we find on the ventral region; in Tunicata on the anterior dorsal region; in Lamellibranchiata on the dorsal region; in Gasteropoda on the dorsal region and also further back; and in the Cephalopods at the posterior portion of sac. The different positions of the sac openings (represented in fig.

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1 by arrow O) follow the same direction, that is, from posterior to anterior, ventrally. Thus in Tunicata the two openings are posterior and posterior dorsal; the posterior dorsal, being the anal or excurrent orifice; this is always the shortest in Tunicata. In Lamellibranchiata the anal tube moves nearer the branchial tube; in the lower forms their outer covering coalescing and of equal length, while, higher up, the tubes becoming entirely separate, and in some of extreme length, the anal tube being the longest. In Pisidium and other forms the branchial tube disappears, and water is received through a ventral opening; while the anal tube yet remains, occupying a posterior position on a line with the antero-posterior axis, in the same position the branchial tube occupied in the Tunicata: and, finally, both tubes become nearly obsolete, and the mantle is cleft all round, except dorsally. Thus the progress of sac opening follows in the same line of rotation with the intestine. The progressive regions of attachment move in an opposite direction (Fig. 1, arrow A). Commencing with the Polyzoa as the lowest class, we have, as in the Cheilostomata, the dorsal portion large and spreading, this being the fixed portion; the anal opening being turned toward this region, as in the Brachiopoda and Tunicata. (The movable part of the ventral surface, which is uppermost, being represented by the little lid). This mode of attachment is the lowest feature; namely, attached along the entire dorsal region.

As we ascend to the higher forms of the class, we have a freeing of the posterior portion of sac, and the viscera permanently occupies this freed portion. In the Brachiopoda we have the sac free, held only by the peduncle; the means of attachment springing anterior, and from the dorsal valve, as in the partially freed Polyzoon. (Crania and Descina are attached as in Lepralia).

In Lingula, where we have the lengthened and flattened sac, the animal stands vertical in the sand. In Terebratula and allied genera, the dorsal valve already assumes preponderance over the ventral valve, and now obtains its normal position uppermost.

All the Tunicates with few exceptions are attached, and by their anterior end.

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In the compound Ascidians like Botryllus, where we have a community of individuals clustering round a common centre, their dorsal as well as anterior regions are attached, or, in other words, the ventral and posterior regions are free only.

Among the Lamellibranchiata nearly all the lower forms, and many of the higher forms are fixed or stationary; and whether moored by a byssus, buried immovable in the mud, or imprisoned in cells of their own making, it is the anterior end which is fixed. This obtains, with important exceptions.

The Monomyarians combine in their structure both high and low characters. In their open mantle, and certain other features, they rank high. In their fixed position, the attachment generally springing from the dorsal region, they rank low. For these reasons, I have placed them in the centre (see Plate, Series II, M) not indicating by this their equal value with the other groups, for I doubt if their separation from the Dimyarians is valid, since the large adductor, composed of two elements, would indicate the presence of both anterior and posterior adductors, combined in consequence of the excessive shortness of their antero-posterior diameter. The Monomyarians present singular features of analogy with the Brachiopoda. Thus they are generally inequivalve. The viscera are compacted toward the dorsal region, and, when attached, they are generally by a process from the dorsal portion, (e. g. Anomia) the lowest feature of attachment. In all these instances, particularly with Anomia, the analogy is very striking; it is analogy only, and nothing more, for in their whole structure, and in the relative proportion of their diameters, they present just the opposite extreme. While we have in Brachiopoda the growth laterally, that is, spreading on the sides and depressed dorsally, and the valves, dorsal and ventral, in the Monomyarians we have the other extreme; the valves are right and left, and the display is on the side, the growth extending ventrally as it were. So narrow are they that in certain forms, Placuna for example, it is almost impossible to conceive the presence of soft parts between the valves. We compare the relative diameters between the Brachiopods and Monomyarians, to show how unlike they are in this respect.

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Diameter.	Brachiopods.	Monomyarians.
Antero-posterior.	Medium.	Small.
Dorso-ventral.	Small.	Very large.
Transverse.	Large.	Very small.

For reason of their excessive narrowness, the greater number of Monomyarians lie on the right or left valve, and as their peculiar form precludes the possibility of locomotion by the usual organ, the foot, they either remain fixed, or swim freely about in the water, by violently closing their valves, as in Lima and Pecten.

Among the Unionidæ, the highest family in the Lamellibranchiata, the animal assumes nearly a horizontal position in crawling, though the anterior end is always the lowest, and generally buried in the mud. Its embryos, like Monomyarians in shape, are attached to the ovisac by the dorsal margin, which is straight, as in Pecten. (Lea's paper on Embryonic forms of Unionidæ, Journ. Acad. Nat. Sci., 2d Series, Vol. IV., plate 5).

By their violent shutting of the valves, while in embryo, they may, after birth, swim, even as Pecten swims; at all events they are said to become attached by a byssal thread while young. Among the Gasteropods we have a few genera attached, or fixed, as in Magilus, Siliquaria, Vermetus, Spiroglyphus, Nerinæa, and Petaloconchus. These are now attached posterior end downward. In Calyptræa they are in a fixed position, secreting a ventral valve, upon which they rest. (It would be interesting to know for a certainty which part first becomes attached in Vermetus and allied forms; their first point of attachment must take place at the mouth of the tube or aperture, which is really anterior and ventral). The Cephalopods are free.

Thus we have the various regions of attachment, changing and following in the direction indicated by the arrow A, in Fig. 1.

1st, Polyzoa: dorsal attachment.

2d, Brachiopoda: dorsal and anterior attachment.

3d, Tunicata: anterior.

4th, Lamellibranchiata: anterior and ventral attachment.

5th, Gasteropods: ventral and posterior attachment.

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While we have thus seen that the area of attachment first springs from the *dorsal* region, and gradually changes as we ascend in structure toward the anterior end, so we find the principal organ of locomotion, i. e. the foot, is first developed from the *ventral* region, and in like manner tending toward the anterior end, as we ascend in the scale, until, in Cephalopoda, the specialized divisions of the foot surround the head, and point directly forward.

Having personally communicated the substance of this paper to Professor James D. Dana, he has, in a letter to me, indicated certain gradient relations among the Lamellibranchs, Gasteropods, and Cephalopods, as manifested in the special characteristics of the head, or anterior part of the body, so clearly illustrating the principle of Cephalization that I now take the liberty of presenting them. In the Lamellibranchs the foot is a simple muscular organ developed from the ventral surface and protruding anteriorly. It is simply an organ of locomotion, in the lower forms not even performing this function. The oral opening is a simple slit, without the power of seizing or triturating its food.

In the Gasteropods the foot is more specialized, and as an organ of locomotion far superior to that of the Lamellibranchiates, having oftentimes three well characterized regions, called by Huxley, the pro- meso- and metapodium, these regions oftentimes supporting certain processes, e. g. cirri, opercula. The foot not only performs locomotion but in many cases has the power of seizing and retaining its prey (e. g. Natica). The mouth has an apparatus for biting and triturating its food, being furnished with an upper jaw, or buccal plate, and a tongue, armed with silicious particles. In the Cephalopoda the foot is so far differentiated as to be separated into prehensile arms furnished with rows of suckers, or hooks. These arms surround the head, and are thrown directly forward. They are capable not only of locomotion, but of seizing their prey, and performing also movements of aggressive action. In the higher forms of Cephalopods, the function of locomotion is delegated to other organs, while the arms subserve the uses of the head alone, and the mouth, furnished with two powerful mandibles opposed vertically, forcibly

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reminds us of a parrot's beak, or that of certain other vertebrates. Thus we have cephalic power manifested in the mechanical action of the foot.

1st, Lamellibranchs—Locomotion.

2d, Gasteropods—Locomotion, Prehension.

3d. Cephalopods—Locomotion, Prehension, and Aggression.

According to the principle of Cephalization, cephalic power is manifested either as a mechanical, sensorial, or psychical force. Thus the Cephalopods possess in the greatest measure, all three; while Gasteropods, not indicating, to any great extent, aggressive action, may be said to manifest but little psychical power; and the Lamellibranchiates manifest essentially only mechanical action.

We have based the preceding considerations on the common structure of each class, and for comparison have given an archetype, as it were, of each class (Series I). In continuing these archetypal figures, as illustrating the relative diameters and mean forms for each class (Series II and III), and also the mean, or average position in nature of the antero-posterior axis (Series IV), we obtain singular features of polarity,* which I will now proceed to indicate; premising, however, that what follows is offered with reluctance, as I have not at present the opportunity to verify the statements as I would wish. In Series II the average lateral form of each class is given. In Series III a transverse section is given of the same figures in Series II. In Series II the arrow A indicates the direction of anterior pole, and D indicates the dorsal region in Series II and III. In Series IV a line for each class is given, representing the average position of their antero-posterior axis in nature (A, anterior pole, P, posterior pole). The central figures in Series II, III, and IV represent corresponding views of the Monomyarians. In the Polyzoa, (Series II, P) the sac is long and cylindrical, the mouth and anus terminate at the posterior pole, and the tentacles surround the mouth only; the anus terminating outside the lophophore. Witness in the highest order of Cephalopods, the Dibranchiates, the sac as in Loligo (Series II, C), long and cylindrical, and in all cases mouth and

*We use this word in its most general sense.

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anus opening anteriorly; the arms surrounding the mouth only. Two rough diagrams, alike in form, but reversed in one case, would represent each class as we have it here.

In Brachiopoda (Series II, B) we have the sac widening laterally, and correspondingly depressed dorsally; mouth and anus opening posteriorly. In Gasteropoda (Series II, G) we have the same features, except that the parts are reversed again. In Tunicata (Series II, T) the sac is lengthened and swollen. Lamellibranchiata (Series II, L) the same. The relative diameters of the Monomyarians are unlike those of any other class, as before pointed out.

It is confidently believed that when these relations, or polarities, between the ascending, and descending, or, as Professor Dana terms them, the Holozoic and Phytozoic classes, have been farther studied, new and interesting features will be revealed. Thus, the resemblances between the Tunicates and Lamellibranchiates are too obvious to indicate.

Among the Brachiopods and Gasteropods, beside what has been pointed out, we have unlooked for similarities, as for instance Descina and Calyptræa, or Terebratula and Hyalæa. Among the Polyzoa and Cephalopoda, though no polarities are brought to mind, except those given above, yet we cannot help remarking how strong the resemblance is between the Polyzoa and Protozoa, through Vorticella: and if Vorticella belongs to Polyzoa, as Professor Agassiz appears inclined to believe, a few steps more bring us to the Ammonitic forms of the Rhizopods. This is speculative (though suggestive), as it is now considered by many that the Protozoa forms a fifth Sub-Kingdom.

In considering a transverse section of the sacs, as shown in Series III, we obtain a like order of polarity. Thus the highest orders in Polyzoa and Cephalopoda present a circular section. Brachiopoda and Gasteropoda are transversely oval; Tunicates and Lamellibranchiates are longitudinally oval, or in lower forms circular; while the Monomyarians have the dorso-ventral diameter in excess, and the transverse diameter reduced to the minimum.

In considering the position, or angle of the antero-posterior axis of each class in nature, we obtain similar results (Series IV).

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Polyzoa and Cephalopoda, we place in a horizontal position, taking a swimming Dibranchiate for comparison: this may be premature however.

Brachiopods and Gasteropods with posterior pole slightly elevated, as in Cyrtia and allied forms of Brachiopods, and any coiled Gasteropod for example. Tunicates and Lamellibranchiates with the axis vertical, the anterior pole being below, and the Monomyarian horizontal again. It must be remembered that the above considerations are taken in their most general sense, representing only the mean for each group, many of them perhaps erroneous. They are given rather for the purpose of indicating a future path of inquiry, which the writer considers fruitful and intends to follow, than as points in any way settled.

In ascertaining the mean position of the antero-posterior axis for the whole branch of Saccata, (that is, the average) we find that a line at an angle of 45° would represent its position in nature; the lower end being anterior. In the Radiates a line through the mouth to the opposite region of the body would stand vertical. In Articulates the antero-posterior axis would be horizontal. Among the Vertebrates, Fishes would be horizontal, as in Articulates; Reptiles have the head slightly elevated; Birds and Mammals still more elevated; so that a mean line, for these classes might be drawn at an angle of 45,° the cephalic region being uppermost. Man stands vertical. Thus in a diagram we would have the following:

Fig. 2.

In the preceding considerations I have endeavored to show the importance of the sac, as the principal and prominent feature in their plan of structure. All animals, re-

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duced to their primary elements, are sacs in one sense of the word, though in one case a radiate sac, in another an articulate sac, etc. Yet nowhere does this character predominate so universally, nor is it expressed so simply as in the Mollusca; the leading idea as it were. It was shown also that, essentially, the heart is on the outer bend of the intestine, or between that and the sac wall, while the principal nerve mass was on the inner bend of the intestine. We would thus state their characters.

SACCATA.

(1) *Animals of a varied form, without a radiate structure and without articulations.*

(2) *Stomach and viscera enclosed by a fleshy sac, which may be closed or open, at either one or both ends.*

(3) *Principal nerve masses, consisting of ganglia, which are adjacent to, or surround the œsophagus.*

(4) *Intestine bending inward, or having an outward flexure.*

(5) *Heart on the outer bend of intestine.*

- SACCATA.
  - HOLOZOIC, OR TYPIC. *Mouth opens anteriorly.*
    - Sac open at anterior end.
      - CEPHALOPODA.
      - GASTEROPODA.
    - Sac opens at both ends.
      - LAMELLIBRANCHIATA.
  - PHYTOZOIC, OR HEMITYPIC. *Mouth opens posteriorly.*
    - Sac open at posterior end.
      - TUNICATA.
    - Sac closed.
      - BRACHIOPODA.
      - POLYZOA.

We must now consider the relations of the Saccata to the other branches of the Animal Kingdom. In the paper of Professor Dana's, above referred to, he has used the terms alphatypic, betatypic, and gammatypic, as a numbering of the grades of types, whether of branches, classes, or orders; also, below gammatypic, we have degradational.

The Radiates are regarded as degradational, and below this, hemiphytoid, also, the terms used above, namely, Holozoic, or true animal forms, and Phytozoic, or plant-like forms.

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Applying these terms to the classes or groups of Saccata, we have the following:

HOLOZOIC.	Alphatypic,	CEPHALOPODA.
	Betatypic,	GASTEROPODA.
	Gammatypic,	LAMELLIBRANCHIATA.
PHYTOZOIC.	Degradational,	TUNICATA.
		BRACHIOPODA.
	Hemiphytoid,	POLYZOA.

Prof. Danahas pointed out many interesting parallelisms between the groups of the different branches. Let us now look at the parallelisms between the groups above indicated, and the other branches. Cephalopods approach nearest the Vertebrates through their lowest class, the fishes, and already many interesting analogies have been pointed out between them.

Gasteropods may be likened to Articulates, through their lowest class, the Worms, through certain resemblances many forms bear to the Leeches, Planarians, and Trematodes. Lamellibranchiates may be considered the essential embodiment of the branch to which they belong. Tunicates and Polyzoa may be compared to Radiates.

Or, in considering their freedom or fixedness in life, we have Cephalopods free, as in all Vertebrates; Gasteropods, a few fixed, as in Articulates; Lamellibranchiates, many fixed as in Saccata, with relation to the other Branches. Tunicates, the greater portion fixed, though they do not compare so well with the Radiates in this respect, but Brachiopods and Polyzoa fixed as in the lowest class of Radiates, the Polyps.

We would thus have

ALPHATYPIC,	*Cephalopds,*	*Vertebrates,*	Fishes.
GAMMATYPIC,	*Gasteropods,*	*Articulates,*	Worms.
BETATYPIC,	*Lamellibranchiates,*	*Saccates.*	
DEGRADATIONAL,	*Tunicates,* / *Brachiopods,*	*Radiates.*	
HEMIPHYTOID,	*Polyzoa,*	*Radiates,*	Polyps.

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Explanation of Plate IV.

Series I. Represents a typical figure of each principal group in Mollusca—viz., P, Polyzoa; B, Brachiopoda; T, Tunicata; L, Lamellibranchiata; G, Gasteropoda; and C, Cephalopoda—(M, indicating Monomyaria, of the second series). These figures are represented anterior end downward, the dorsal region being turned to the left. The tube within each cut, represents the intestine, the larger end of which is the mouth, and the smaller end the anus. The harp-shaped figure represents the heart, and the star represents the pedal ganglion.

Series II. Represents similar views, with less detail. The dorsal region in this series is uppermost, and the anterior end, is turned to the left, as indicated by arrow A. The curved line indicates the intestine, the large end being the mouth.

Series III. Represents transverse sections of corresponding figures in Series II.

Series IV. Represents the mean position in nature, of the antero-posterior axes of the figures represented above, A, Anterior pole, P, Posterior pole. The vertical rows of figures are identical.

Note. Since lines 7—12, page 164, were printed I have had an opportunity of quoting the remarks made by Professor Peirce as reported in the Proc. Amer. Acad. Arts and Sci., Vol. III, p. 8.

"Professor Peirce also presented a communication upon the form assumed by an elastic sac containing a fluid.

The positions of unstable equilibrium he found to divide themselves into four special forms, the annular, cylindrical, that of a cylinder with a bilateral character, and the double or multiple cylinder. The ultimate form of the first case is a sphere.

He also alluded to the interest of this fact to those who were not themselves mathematicians. For the primitive forms which Professor Agassiz had found to be the four types of the animal kingdom were the same, the Radiata being represented by the sphere, the Mollusca by the cylinder, the Articulata by the bilateral, and the Vertebrata by the double cylinder. Now, as all animal forms begin as elastic sacs, containing fluids, these forms seem the necessary ones for the condition of equilibrium."

It was Mr. Hyatt who defined the animal forms in the terms used on page 164. E. S. M.

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XII. *Synopsis of the Polyps and Corals of the North Pacific Exploring Expedition, under Commodore C. Ringgold and Captain John Rodgers, U. S. N., from* 1853 *to* 1856. *Collected by Dr. Wm. Stimpson, naturalist to the Expedition. With Descriptions of some additional Species from the West Coast of North America.*

By A. E. VERRILL.

PART II, ALCYONARIA. With two Plates.

[Communicated February 29, 1865.]

The specimens upon which the following descriptions are based were mainly collected by Dr. Wm. Stimpson while acting as naturalist to the expedition.

They were for the most part preserved in alcohol, and many are accompanied by notes and drawings of the soft parts, which have been reproduced in the plates. In most instances I have given the descriptions of the colors of perishable parts, as well as notes on the mode of occurrence, in Dr. Stimpson's own words.

Descriptions of a few species in the collection of the Smithsonian Institution and the Yale College museum, from the Pacific Coast of America, have been added, for the sake of making thepaper more complete.

SUBORDER, PENNATULACEA.

FAMILY, PENNATULIDÆ.

PTEROMORPHA EXPANSA Verrill.

Plate 5, *figure* 1.

The pinnate portion is broad ovate, abruptly rounded below; peduncle, or basal portion, thick, swollen, a little less than half the entire length. Pinnæ crowded, about thirty-two on each side, long and wide, somewhat thickened, angular, the naked posterior margin somewhat concave, the anterior rounded and supporting numerous small polyps, and strengthened with sharp spines, which are often in clusters of two or three. The outer half of the sides of the

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pinnæ as well as their anterior edges, are covered by small polyp-cells; basal half of the lower surface densely covered by small papillæ. Axis strong, pointed at the ends; interior cavity of the base small. Length of a large specimen in alcohol 6 inches, breadth across pinnæ 3.5, length of peduncle 2.75.

"Color (in life) white, bases of the polyps dirty white, on the stalk there are a few scattered blackish spots.

It lives with the stalk immersed in the mud like *Renilla;* undulating, moving contractions are often seen in the stalk, resembling those of a *Holothuria.*"

Bays opposite Hong Kong, China. Common in 6 fathoms, mud, April, 1854. Dr. Wm. Stimpson.

Leioptilum Gray.

This genus is most nearly allied to *Pennatula*, but differs in having soft, fleshy pinnæ, with even borders and no apparent spicula. The polyps are in two or more rows along the edges of the pinnæ. The peduncle is enlarged into a conspicuous, contractile bulb. The axis is very slender, quadrangular, and extends only through the middle portion of the body. The rudimentary individuals on the back are developed in the form of conspicuous papillæ.

Leioptilum undulatum Verrill, nov. sp.

Basal portion smooth, pointed at the end, swelling into a large bulb just below the pinnæ. Posterior part of the body, except along a narrow median band, covered with large verruciform rudimentary polyps, forming rounded papillæ, some of which are a tenth of an inch in diameter. Pinnæ large, very broad and rounded, with narrow bases, the edges thrown into undulations or frills. Polyps rather large, arranged in three alternating rows along the edges of the pinnæ. Axis very slender, about two inches long, extending from about an inch above the basal end to about the middle of the pinnate portion. The naked base, of a specimen 4.25 inches long, is 1.75; the largest pinnæ .75 long and 1.12 wide. This specimen has twenty-five pinnæ on each side. Pinnacati Bay, Cal. Mr. Stone. (Coll. Smithsonian Inst.)

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PTILOSARCUS.

This section of the genus *Sarcoptilus* Gray seems to be sufficiently distinct from the original type of that group to rank as a separate genus.

The form is thick, club-shaped; the pinnæ numerous, crowded, with thickened edges on which the polyps are arranged in several rows, each cell surrounded by prominent, spine-like spicula. The back of the body, except along a narrow median space, is covered by two broad bands of rudimentary polyps, appearing like crowded granulations. The basal portion is thick and bulbous, with two large interior cavities, one of which extends along the anterior surface, communicating with the pinnæ, the other along the dorsal portion.

The axis is long, fusiform, tapering to very slender points, which are curved (in preserved specimens) into a loop at each end. Connected with the lower part of the axis are very strong thickened muscles, which pass obliquely upward and outward to the wall-tissues, while higher up, a little above the lowest pinnæ, other shorter ones are attached, which pass obliquely downward to the wall.

PTILOSARCUS GURNEYI.

Sarcoptilus (*Ptilosarcus*) *Gurneyi* J. E. Gray, Ann. and Mag. Nat. Hist., Vol. 5, p. 23, pl. III, f. 2, 1860; ? *Pennatula tenua* Gabb. Proc. Cal. Acad. Nat. Sciences, II. page 166. 1862.

Basal portion about one half the whole length, thick, bulbous, very muscular, the surface strongly sulcated in contraction. Pinnæ smooth on the sides, broad, rounded, nearly semicircular with a broad base, the posterior edge extending beyond the base as a rounded lobe: the edge is thickened and covered by the polyps arranged in four rows, each cell armed with two sharp spinules. Along the back are two broad bands of very small papillæ or granuliform, rudimentary polyps.

Length of a large alcoholic specimen, having fifty-two pinnæ on each side, 10 inches; greatest breadth 2; length of pinnæ .80, breadth 1.50; length of naked base 4.75, diameter 1.25.

Puget Sound, Wash. Terr. Dr. C. B. Kennerly, Dr. G. Suckley. (Coll. Smithsonian Inst.)

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FAMILY, PAVONARIDÆ Dana, restricted.

VIRGULARIA PUSILLA Verrill, nov. sp.

Plate 5, figure 2.

Very small and slender, the pinnæ extending nearly to the base, which is rounded and bulbous; pinnæ of the upper portion surrounding the stalk on all sides except the back, which is naked; below they are separated also by a narrow anterior space, but the pinnæ of the opposite sides appear to coalesce anteriorly higher up, producing a subverticillate arrangement. The middle whorls are separated about .1 of an inch; polyps small, twelve to fourteen in the median whorls, somewhat crowded; tentacles slender, elongated, with slender, rather distant, lateral lobes along nearly their whole extent. Length 1.75 inches; diameter at the middle .12.

"Bays opposite Hong Kong, China, in 6 fathoms, mud. April, 1854. Color pale orange or dirty red." Dr. Wm. Stimpson.

The only specimen in the collection is probably young.

FAMILY, VERETILLIDÆ Gray, emended.

VERETILLUM STIMPSONI Verrill, these Proceedings, p. 152, April, 1865.

Plate 5, figures 3, 3a.

Polypiferous portion of surface thick, swollen, somewhat fusiform, broadest below the middle, the surface granulous; basal portion less than a third of the whole length, bulbous, smooth, and very contractile; polyps rather distantly scattered, arranged somewhat in quincunx; between them are numerous minute papillæ or rudimentary polyps; in expansion the polyps are much exsert with very slender elongated tentacles, bordered with rather distant, elongated, slender lobes in a single row on each side, commencing close to their bases; axis short, thick, fusiform, situated just below the commencement of the polypiferous part.

Whole length of the largest specimen in alcohol 3.5 inches; naked part 1; diameter where broadest 1; length

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of axis .35. When living, length 6.5 inches; breadth 1.75; polyps about .75, exsert.

"Hong Kong Harbor, China, in 6 to 10 fathoms, mud, March 1855; also in 24 fathoms, shelly sand, China Sea, 23° N. lat. April, 1855. Body whitish cream-colored; polyps transparent with an opaque digestive tube, bluish white about the bases of the tentacles; base white, somewhat longitudinally striated." Dr. Wm. Stimpson.

VERETILLUM BACULATUM Verrill, these Proc. p. 152, April, 1865.

Small, clavate, broadest near the upper end, which is obtusely rounded; polypiferous portion about one half the whole length; naked basal portion elongated, pointed below, in one specimen, with a distinct terminal pore; axis small, fusiform, less than one half an inch long; polyps much smaller and more numerous than in the preceding.

Length of the only specimen obtained 2 inches; diameter .3.

Sea of Ochotsk, in 25 fathoms, taken Aug. 1855, by U. S. Steamer "John Hancock," Capt. Stevens; preserved by L. M. Squires.

KOPHOBELEMNON CLAVATUM Verrill, l. c. page 152.

Veretillum clavatum Stimpson, Proc. Phil. Acad. Nat. Sciences, Vol. 7, p. 375, June, 1855.

Plate 5, figures 4, 4a, 4b.

Polyps large, the tentacles long and slender with oblong lateral lobes; surface of the body between the polyps, irregularly papillose, variegated, punctate with orange and spotted with brown; basal portion white, with a pointed extremity. Length 2 inches.

Bay opposite Hong Kong, in 6 fathoms, mud, April, 1854. Dr. Wm. Stimpson.

This species is more claviform and has more crowded polyps than K. Burgeri Herklotz. The naked dorsal space is scarcely apparent, owing to the crowding of the polyps towards it upon each side.

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SUBORDER, GORGONACEA.

FAMILY, GORGONIDÆ.

GORGONIA VENOSA Valenciennes.

Off Madeira, in 25 fathoms, rocks. Dr. Wm. Stimpson.

LEPTOGORGIA CUSPIDATA Verrill, nov. sp.

Corallum broad, subflabelliform, irregularly branching nearly in a plane, the principal branches arising near the base divide above in an irregularly dichotomous manner, forming a rather thick fasciculate clump. Branchlets thick, rigid, nearly straight, tapering to a point. Cells numerous, rather large, rounded, covering the surface of the branchlets except along a narrow median space on each side. Grooves rarely distinct except near the base. Color deep purple; cells yellow; axis black.

Cape St. Lucas, Cal. J. Xantus. (Coll. Smithsonianl Institution).

FAMILY, PLEXAURIDÆ Gray.

PLEXAURA FRIABILIS Lamouroux.

Cape of Good Hope. Dr. Wm. Stimpson.

I refer with some doubt to this species, specimens of a large dichotomous *Plexaura* with long, upright, cylindrical branches, the terminal ones often undivided for a foot or more, and about .3 of an inch in diameter, tapering but little at the ends. The cells are often a little prominent and evenly crowded; the axis dark brown, scarcely compressed, even at the axils; the cœnenchyma very spiculose and friable.

It resembles in form and general appearance *P. crassa* (Gorgonia vermiculata Lk.) of the West Indies.

LOPHOGORGIA PALMA Edw. and Haime.

Gorgonia palma Pallas, 1766. *Gorgonia flammea* Ellis and Solander, 1786.

False Bay, Cape of Good Hope. Not rare in 20 fathoms, rocks, Oct. 1853. Dr. Wm. Stimpson.

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One specimen differs from the ordinary form in having a large, very compressed trunk, with the long, subdigitate branches much more flattened than usual; color, in alcohol, light gray.

Lissogorgia Verrill.

Proc. Boston Soc. Nat. History, 1864.

In this genus the cœnenchyma is very thin, friable and highly spiculose throughout, the spicula conspicuous at the surface and covering the verruciform cells, which are eight-lobed in contraction. Tentacles strengthened at the base by large spicula, which often radiate within the dried cells. Axis horn-like, smooth, usually without visible striations. Type, *L. flabellum* (Antipathes flabellum Auth.)

Lissogorgia flexuosa Verrill, nov. sp.

Corallum much branched, subflabelliform, the branches irregularly pinnate, branchlets slender, divaricate, often coalescing; axis soft and flexible, dark brown; cœnenchyma thin, membranous, filled with large fusiform spicula, visible at the surface; polyp cells rather large, rounded, verruciform, covered by numerous elongated and pointed, imbricated spicula. Color, in alcohol, grayish white.

Hong Kong. Dr. Wm. Stimpson.

Muricea sinensis Verrill, nov. sp.

Plate 5, figures 5, 5a.

Corallum irregularly dichotomous with elongated, subclavate branchlets; polyp cells verruciform, rather large, somewhat prominent, irregularly crowded, surface granulose with crowded spicula; external portion of the cœnenchyma hard and coriaceous, rather thick, the surface thickly covered by small oblong spicula; tentacles strengthened by numerous red spicula. Axis, in alcohol, very soft and flexible near the ends, slender, dark brownish below; color of the cœnenchyma deep red. Height 8 inches, diameter of branchlets .15.

Hong Kong. Dr. Wm. Stimpson.

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MURICEA ? DIVARICATA Verrill, nov. sp.

Plate 5, *figures* 6, 6*a*.

Corallum low, much branched somewhat in a plane, branchlets slender, elongated, divaricate; covered by the very prominent irregularly crowded, sometimes secund, polyp cells; these are mostly .2 of an inch high and spread abruptly at right angles to the branches, and are somewhat claviform, the summits being enlarged. The cœnenchyma is very thin and filled with large, thickened spicula, conspicuous at the surface, producing a granulated appearance; the polyp cells are thickly covered by more elongated, fusiform spicula, which are irregularly arranged, interlaced and conspicuous at the surface, converging at the summit of the cells, which are eight-rayed in contraction. Color, in alcohol, light ash gray, axis light fuscous, soft and flexible. Height three inches.

Hong Kong. Dr. Wm. Stimpson.

ACANTHOGORGIA COCCINEA Verrill, these Proceedings, p. 152.

Nephthya coccinea Stimpson, Proc. Phil. Acad. Nat. Sci. June, 1855, Vol. 7, p. 375.

Plate 6, *figures* 7, 7*a*.

All the specimens observed of this species consist of simple clavate stalks, rising from broadly expanded bases, which, like the stalk, are densely covered with large, open polyp cells, irregularly crowded over the whole surface; the cells are surrounded by numerous, deep red, prominent, imbricated, spines, their outward ends long and sharp, but irregularly branched at their bases, forming thus a cluster of short, secondary spines; axis light brown, slender and flexible. Height of the largest specimens 2 inches, diameter .2. Below each tentacle, imbedded in the external membrane, are two rows of linear, crimson spicula, converging towards each other so as to form a series of V-shaped markings with the apex towards the ends of the tentacles.

Hong Kong, China, in 10 fathoms, attached to dead shells. "The specimens when contracted look like the fruit

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of the Sumac of New England (*Rhus typhina L.*) Color bright red, that of the tentacles and spicula deepest; polyp bodies hyaline, yellowish flesh color." Dr. Wm. Stimpson.

FAMILY, PRIMNOIDÆ M. Edwards, emended.

PRIMNOA COMPRESSA Verrill, nov. sp.

Corallum much branched in a plane, flabelliform, consisting of several large branches arising from near the base, which give off, alternately from each side, numerous, long, slender, acute branchlets, which rise at a very acute angle with the main branches and are often again subdivided in the same way; branches and branchlets strongly compressed in the plane of the branches, delicately striated, stony, near the base dark brown, the branchlets yellowish white, their tips setaceous. Height of largest specimen 24 inches; diameter of largest branches .25. Cœnenchyma and polyps not observed.

Aleutian Islands. Capt. Gibson.

FAMILY, GORGONELLIDÆ Valenciennes.

JUNCELLA LÆVIS Verrill, nov. sp.

Corallum tall, simple, subcylindrical, rather slender, diminishing in size both at the summit and near the base, where the polyps become obsolete; cells appressed, scarcely prominent, arranged in two broad bands, leaving a narrow, median, naked space on each side, along which there is a well marked groove; they are placed alternately at a distance of about .2 of an inch, in about six vertical rows on each side, producing a quincunx arrangement; axis slender, cylindrical, calcareous, white, surrounded by about sixteen longitudinal tubes, two of which are larger and correspond with the lateral grooves, the others to the rows of polyps. Length of the single specimen, imperfect at each end, 20 inches; greatest diameter .25. Color yellowish brown, in alcohol.

Hong Kong, China. Dr. Wm. Stimpson.

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FAMILY, ISIDÆ.

PARISIS LAXA Verrill, these Proceedings, p. 152.

Corallum flabelliform, loosely branched, openly reticulated, only a few of the branches coalescent; branchlets spreading nearly at right angles, somewhat elongated, curved, obtuse at the ends; papillæ rather large, irregularly crowded; cœnenchmya thin, roughened by the points of minute spicula; axis slender, consisting of white calcareous joints alternating with shorter dark brown ones of the same thickness, but softer; color, in alcohol, light gray. Height of a small specimen 3 inches; width 3; diameter of branchlets .20.

Off Hong Kong, China, in 15 fathoms, shelly gravel, May, 1854. Color, in life, bright light blue. Dr. Wm. Stimpson.

MOPSELLA JAPONICA Verrill, nov. sp.

Low, spreading, dichotomous, branching nearly in a plane; branches slender, diverging at an angle of about 45,° obtuse at the ends; cells rounded, papilliform, rather large, crowded. Color, of all the specimens observed, vermillion with yellow polyps.

Simoda, Japan. Dr. Wm. Stimpson.

This species is most nearly allied to *M. coccinea* (Isis coccinea Ellis and Sol.), but the branchlets do not coalesce as in that species, and spread much less abruptly. The cells, also, are considerably larger.

SUBORDER, ALCYONACEA.

FAMILY, ALCYONIDÆ.

ALCYONIUM RUBIFORME Dana.

Lobularia rubiformis Ehrenberg.

Arctic Ocean in 35 fathoms. Capt. J. Rodgers. West Coast of Behrings Straits in the Laminarian Zone. Dr. Wm. Stimpson.

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ALCYONIUM, SP.

A specimen badly preserved, and too imperfect for identification.

Hong Kong. Dr. Wm. Stimpson.

ALCYONIUM?

The corallum consists of rounded, glomerate clusters of large, verruciform polyps, striated at the tops. Color, in alcohol, bright red.

Sea of Ochotsk. L. M. Squires.

SARCOPHYTON AGARICUM Verrill.

Alcyonium agaricum Stimpson, l. c. page 375.

This species forms mushroom-shaped disks, which are circular, convex, with entire, revolute margins, and supported on a central pedicel about one-third as broad as the disk.

The polyps cover only the upper surface, are rather large, three-tenths of an inch long and an eighth of an inch distant, the surface between them being covered with minute dots. Upper surface of the disk bluish gray, polyps lighter with still paler tentacles; lower surface and pedicel dark cream colored. Diameter of disk 1.5 to 2 inches; of pedicel .5.

Kagosima Bay, Japan, not uncommon in 10 fathoms, sand, January, 1855. Dr. Wm. Stimpson.

NEPHTHYA AURANTIACA Verrill, nov. sp.

Corallum thyrsoid in form, consisting of a stout naked pedicel, divided above into several short, thick branches, which are covered by small, glomerate clusters of crowded polyps; cells very small, verruciform, much crowded; their bases covered with closely imbricated, red spicula; the bases of the tentacles with golden yellow ones. Height 2 inches; diameter of pedicel .3. Color of pedicel and branches pale pink; polyp cells bright red at base, yellow at summit.

China Sea in 23° N. lat. Dredged in 28 fathoms, shelly gravel. Color pale reddish gray; tentacles light yellow Dr. Wm. Stimpson.

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NEPHTHYA THYRSOIDEA Verrill, l. c. p. 151.

Plate 6, *figures* 8, 8*a*, 8*b*.

Corallum thyrsoid, consisting of a pyramidal head of compound, glomerate clusters of polyp cells, supported by a short, thick pedicel. The short branches arise from all sides of the main trunk and spread abruptly, dividing at once into numerous small rounded lobes, which are densely covered by the crowded polyps; cells larger than in the preceding, less thickly covered by the spicula, which are yellowish gray and quite small. Height of the largest specimen, 3 inches, diameter 2, diameter of pedicel .5, length of naked part .75.

False Bay, Cape of Good Hope. "Taken commonly in small clusters, rarely in large ones, in 20 fathoms, rocks, Oct. 1853. Color wine-yellow or light brown; polyps dark purplish just under the tentacles; the latter palish, nearly white; stalks with irregular, transverse, elevated, silvery lines of spicula." Dr. Wm. Stimpson.

SPONGODES GIGANTEA Verrill, Bulletin of the Museum of Comparative Zoölogy, p. 40. Jan., 1864.

Large, paniculately branched; principal branches few and large, covered on all parts by short, thick, glomerate branchlets, which are themselves divided into numerous clusters or small heads of polyps; the polyps are small, not crowded, most of them armed with a bundle of long, white, prominent spines, some with smaller single ones; bases of the tentacles filled with numerous red spicula; the trunk is very open, cavernous, the walls membranous, filled with slender, white spicula; the base divided into root-like expansions. Height 12 inches or more; diameter of trunk, near the base 3; of principal branches 2. Color of trunk, in alcohol, brownish gray; polyps dark red, with conspicuous white spines.

Hong Kong, China, on rocks in 1 fathom, April, 1854. Dr. Wm. Stimpson.

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SPONGODES CAPITATA Verrill, Bulletin of the Museum of Comparative Zoölogy, p. 40. Jan., 1864.

Trunk short and thick, dividing rapidly in a dichotomous manner, forming a broad rounded clump. Branchlets much subdivided, corymbose, the polyps all terminal, small, verruciform in contraction, in rounded clusters of forty or fifty; with these are often intermingled little groups of three or four individuals supported by slender, white spines, one of which is longer than the rest, and considerably exsert, supporting one of the cells on its side. The tentacles and polyp walls are also strengthened by slender white spicula.

Height of a large specimen 4 inches, breadth 5, diameter of polyps about .05.

Hong Kong, China. Dr. Wm. Stimpson.

SPONGODES GRACILIS Verrill, nov. sp.

Trunk slender, arborescently branched, the branchlets lax, a little elongated, furcate, the polyps mostly arising singly along their sides in a secund manner, not crowded, scarcely clustered, small but quite prominent, supported by several slender spines, the walls and tentacles strengthened by numerous very slender fusiform spicula of a bright red color. The trunk and branches are open, membranous, diaphanous, filled with long, slender, curved, fusiform spicula of a white color.

General color light pink. Height 2 inches; diameter of trunk .25; of polyps .02.

Loo Choo Islands. Dr. Wm. Stimpson.

FAMILY, CORNULARIDÆ.

ANTHELIA LINEATA Stimpson, l. c. p. 375.

Plate 6, *figures* 9, 9*a*, 9*b*.

Polyps elongated, tapering somewhat towards the disk. Tentacles nearly half as long as the body, slender, tapering, with a single series of oblong, somewhat irregular papillæ, those near the base of the tentacles shorter and nearly obsolete. Body pale brownish with eight, longitudinal, lead-colored stripes, tentacles bright blue. Length of body about an inch.

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Hong Kong. "Abundant on rocks at low-water mark, which it covers with a light bluish scum." Dr. Wm. Stimpson.

TELESTO RAMICULOSA Verrill.

Cornularia aurantiaca Stimpson, l. c. p. 375. (non T. aurantiaca Lamx.)

Plate 6, *figures* 10, 10*a*, 10*b*.

Corallum irregularly branching, the branches and corallites straight, subcylindrical (clavate when young) marked with numerous, fine, longitudinal sulcations. The upper portion of the polyps projecting considerably beyond the firmer tubes in expansion, pellucid, somewhat constricted at the junction with the tubes. Tentacles long and rather broad, with a single series of elongated lateral lobes, which are themselves tuberculated. Color pale orange, polyps transparent with a few linear spicula on the sides, stomach crimson. Height 2 inches.

Hong Kong. Dredged sparingly in 10 fathoms, shelly bottom. Dr. Wm. Stimpson.

TELESTO? NODOSA Verrill, nov. sp.

In this species the stalks usually rise half an inch or more and then divide at once into a cluster of twelve to fifteen slender corallites or branchlets, which diverge from one point. By continued growth another leading polyp arises from the cluster and after a short distance produces another similar cluster, thus forming an elongated stalk, densely ramulous along the sides, except where the intervals between the clusters occur, and even there scattered cells often appear. Corallites slender, turbinate, a third of an inch long, the walls very thin, encircled by numerous elevated rings, and finely striated longitudinally.

Height of the largest specimen about three inches.

Loo Choo Islands, in pools at low water. Dr. Wm. Stimpson.

Dry specimens only of this species are in the collection, and therefore its true characters are somewhat uncertain. In many respects, and especially in the transverse rings around the tubes, it resembles some species of *Tubularia*.

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Sarcodictyon.

A species of this genus occurs creeping over dead shells. The polyps in alcohol are mostly contracted and form scattered verrucæ about a line in diameter and rather mo re in height, connected by slender, fleshy stolons.

Hong Kong, China. Dr. Wm. Stimpson.

Family, Tubiporidæ.

Tubipora rubeola? Quoy and Gay.

Bonin Islands. Dr. Wm. Stimpson.

I refer to this species, with much doubt, a fragment of *Tubipora* of very light red color, having the transverse plates about .25 of an inch apart; the tubes .1 in diameter. It is too imperfect to be determined satisfactorily, if, indeed, it be possible to determine species of this genus from the dry corals.

Explanation of the Plates.

Plate V.

Figure 1. Pteromorpha expansa Verrill; a polyp enlarged.

Figure 2. Virgularia pusilla Verrill; a polyp much enlarged.

Figure 3. Veretillum Stimpsoni Verrill; a polyp somewhat enlarged; 3*a*, structure of the surface between the polyps.

Figure 4. Kophobelemnon clavatum Verrill; natural size, with the polyps expanded, front view; 4*a*, a polyp much enlarged, showing outline of stomach, below which are, apparently, clusters of eggs; 4*b*, a tentacle much magnified.

Figure 5. Muricea sinensis Verrill; a branchlet, natural size; 5*a*, one of the contracted cells magnified to show the spicula. This and the next were drawn from nature by Mr. E. S. Morse.

Figure 6. Muricea divaricata Verrill; portion of a branch, natural size; 6*a*, a contracted cell much magnified, showing spicula

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Plate VI.

Figure 7. Acanthogorgia coccinea Verrill; a polyp much enlarged, showing spiniform spicula at the base and small spicula below the tentacles; 7*a*, view of a polyp from above.

Figure 8. Nephthya thyrsoidea Verrill; a cluster of polyps from a branch, slightly magnified; 8*a*, a polyp partially contracted, much enlarged to show the spicula; 8*b*, one of the spicula greatly magnified.

Figure 9. Anthelia lineata Stimpson; cluster of polyps natural size; 9*a*, a polyp enlarged; 9*b*, a tentacle magnified.

Figure 10. Telesto ramiculosa Verrill; a group of polyps in contraction, natural size; 10*a*, an expanded polyp much enlarged; 10*b*, a contracted polyp somewhat magnified.

Note. Part I of this paper, including a Synopsis of the Classification of Polyps, herein adopted, was published under a somewhat different title in the fifth number of these Proceedings, page 145. Part III, embracing descriptions of the *Actinaria*, will appear as soon as the necessary plates can be completed.

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XIII. *Observations on Polyzoa. Suborder Phylactolæmata.*

By Alpheus Hyatt.

With nine Plates.

[Communicated October 10,* 1864.]

Introduction.

The investigations recorded in the following pages are the results of observations made on the American species of the Phylactolæmata; with the intention of elucidating the structure of the genera, and of presenting the laws of their structural combination as fully as this can be accomplished within the limits of the present communication.

For this purpose synoptical tables have been given, exhibiting the anatomy of the different divisions, as far as our knowledge of the adult animals would permit.

Had such a plan been possible at the present time, the synopsis would have embraced only the anatomy of the most complicated species of each generic series; and other tables, similarly constructed, illustrating every genus, would have been prefixed, one individual of each species being selected for analysis. But the small number of species now known in each genus not affording material enough for perfecting this system, the tables include only general statements of the characters of each genus, and these are arranged in a linear series in order to show clearly their serial relations. I venture, however, to assert, that, notwithstanding these defects, the results obtained by this mode of procedure are more exact, than if the usual methods of describing the anatomy had been followed.

The advantages of thus analyzing the anatomical features of any natural division are at once apparent. Their organization, as a whole, is rendered plain; and the reader is enabled to trace, throughout the structure of the group, not only the changes of any organ by itself, but even of

*During the proof reading I have embodied in the original text many new facts discovered since the 10th of Oct., 1864, and the communication, therefore, may be considered as covering a period extending from that date to the day of publication.

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the different systems of organs, from their lowest to their highest states.

The laws, also, according to which the changes, or differences in the parts, take place, are better illustrated by such a tabular view, than by any other method.

The manner commonly pursued of describing the minute differences between species, or genera, and of simply generalizing with regard to their anatomical peculiarities, is very unsatisfactory. It does not afford the means for comparing the anatomical composition of the parts of the individual in each species, or genus, which is necessary to a complete understanding of the whole, and the differences are sought for and described, to the neglect of the agreements, that are either passed by, or only casually noticed in the descriptions of the larger divisions. Such errors are avoided by the use of analytical tables, which, besides the advantages before described, set forth the similarities as prominently, as the differences. We thus never lose sight of the initial points of the structure, while the differences, or changes, from time to time appearing, stand out even more vividly against the common background of similarities.

It is far from my intention to underrate the labors of naturalists who devote themselves to the discovery and publication of new forms; their labors are essential to the progress of science. The ordinary mode, however, of prosecuting these investigations is, perhaps, too disconnected, species being habitually regarded in the light of isolated creations, rather, than as allied to others by the larger number of their essential characters. This engenders a habit of always looking for differences, and overlooking agreements, which the study of series of species, or even of series of individuals would correct.

The facts published in these "Observations" have been verified by my own experience, with the single exception of the spermatozoa. These I have not yet seen, my observations having been made, for three successive seasons, principally during the fall and winter months.

The questions involved in the body of the paper, and the difficulties to be overcome in obtaining living European specimens have obliged me to quote extensively from

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the works of foreign naturalists. References, however, are always made to the original publications, and the statements used have been, in all cases, sifted of facts that did not correspond with my own researches upon closely allied American species.

The nomenclature of Professor Allman's exhaustive "Monograph of the Fresh-water Polyzoa" has been adopted throughout, with the exception of a few alterations, which become necessary, partly in consequence of some ideas of my own, with regard to the composition of the organs, differing from those of Prof. Allman, and, partly, because I here adopt a new view of the relations of the anterior and posterior poles of the body, originated by my friend Edward S. Morse.* In an article published in these Proceedings he homologizes the parts of the animal in the various classes of the Mollusca, and arrives at the conclusion, as surprising, as it is truthful, that the attached end of a Polyzoön is in reality the anterior, and that the peduncular end of a Brachiopod is the homologue of this, and, also, anterior.

It therefore becomes necessary to alter the commonly received nomenclature, and to denominate the attached end of a Polyzoön the anterior; the free end the posterior; the anal side the dorsal; and the opposite, or so called hæmal side, the ventral.

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*A Classification of Mollusca based on the principle of Cephalization. Proc. of Essex Inst., Vol. IV, No. VI, p. 162.

NOTE. I am indebted to Dr. Joseph Leidy, of Philadelphia, for identifying my specimens of Fredericella regina with his species, for tracings of all the species described by him, and for other valuable information. I desire, also, to return thanks to Professor H. J. Clark, of Harvard College, Professor A. E. Verrill, of Yale College, Professor Alfred Mayer, of Penn. University, Professor Theodore Gill, of the Smithsonian Institution, Mr. Elliott Smith and Mr. S. I. Smith, of Norway, Maine; to all of whom I am under obligations for important assistance.

My thanks are also due to the Officers of the Smithsonian Institution, of Washington, and the Peabody Institute, of Baltimore, for the use of books which I could not have otherwise obtained.

It is but just that I should also express the feelings of gratitude with which I cherish the memory of my father, Mr. Alpheus Hyatt, of Baltimore, whose long continued generosity, while living, enabled me not only to accomplish this undertaking, but to plan, and prosecute others of a similar kind.

Mr. Edward S. Morse perfected the drawings with the skill of an

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The unquestioning manner with which I take up these views may excite some surprise, but they are founded upon facts which calmed all the doubts I at first entertained, and satisfied me entirely of their correctness. Mr. Morse's paper, entitled "*A Classification of the Mollusca based on the principle of Cephalization*," fully illustrates the homologies, as well, also, as the general plan of that subkingdom.

Mr. Morse has, also, done me the honor of quoting from my manuscript the term *Saccata* as a new name for the Mollusca. Since it has been so auspiciously introduced to science, and, as such a definitive term seems to be needed to give uniformity and completeness to the nomenclature of the four plans, I shall make no further excuse for its employment in the future.

Bibliography and Classification.

There is no bibliography of the Phylactolæmata, or in fact of the Fresh-water Polyzoa taken together, as far as our own country is concerned, but, in Europe, they have, from the time of Trembley,* their discoverer, attracted much attention, and the list of works, that may be consulted with profit, is extensive. The principal among these are the writings of Dumortier and Van Beneden, Professor All-

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accomplished draughtsman, and with all the interest of a zoölogist and personal friend. I am indebted to him both for this, and for many other favors that have rendered it possible for me to publish at an early date. In fact, my only regret, in connection with this article, is, that a gentleman of such acknowledged ability, whose time is important to science, should not be able to devote it to his own original investigations.

The lenses employed were made especially for the purpose by Robert B. Tolles, of Canastota, N. Y. The one half inch objective having an angle of 175° and one fifth of an inch working distance was especially well suited for the examination of living animals.

Mr. J. F. Richardson, of Portland, executed the engraving of the plates with the same skill he has shown in other scientific works, and with more than usual care.

The wood cuts are very large for a black ground, and, being printed directly from the wood, required all the skill and patience of Mr. Holland to produce accurate impressions.

*Mémoire pour servir à l'histoire d'un genre des polypes d'eau douce. 1744.

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man, and Mr. Albany Hancock.* These experienced naturalists surveyed the whole field, and, armed with powerful modern microscopes, they completely disclosed the anatomy and physiology, making nearly all preceding explorations interesting only as matters of history.

Dr. Leidy is the sole authority upon this subject in America.† His observations have given us all the information we at present possess of our native species, besides adding two new and singularly interesting genera, Pectinatella and Urnatella, to the systematic catalogue. Of these two, Pectinatella alone belongs to the Phylactolæmata.

Nothing of a general nature having been published in this country, it may, perhaps, be well, before proceeding with the structural analysis of the Phylactolæmata, to give a sketch of the classification and a description of the different forms of this suborder.

The Polyzoa, for a long time confounded with the Radiata, were first definitely separated by Thompson in 1830, and called by him Polyzoa, thus taking precedence of Bryozoa, the name afterwards given them by Ehrenberg in 1831.‡

In 1834, De Blainville, although still continuing to associate them with the Radiata, set off the genera Cristatella, Plumatella and Alcyonella as a subclass, styling them "Polypiaires douteux."‖

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*Dumortier & Van Beneden. Hist. Nat. d. Polypes composés d'eau douce. Nouv. Mem. de.l'Acad. Roy. de Bruxelles. Vol. 16. 1843.

Van Beneden, Recherches sur les Bryozoaires. Mem. de l'Acad. Roy. de Belgique. Vol. 21. 1848.

Dumortier & Van Beneden. Hist. Nat. des polypes com. d'eau douce. Mem. de l'Acad. Roy. de Bruxelles, comp. au tom. 16. 1848.

Albany Hancock. On the Anatomy of the Fresh-water Bryozoa, with descriptions of new species. Ann. and Magazine of Nat. Hist. Vol. 5. 1850.

Prof. Allman. Monograph of the Fresh-water Polyzoa. Ray Society, 1856.

†Dr. Joseph Leidy. Proc. Philadelphia Acad. of Nat. Sciences, Vols. 5, 7, and 10.

‡Busk. On the priority of the term Polyzoa. Ann. and Mag. Nat. Hist. 2d Ser. Vol. 10, p. 352. 1852.

‖De Blainville. Man. d'Actinologie et de Zoöphytologie. p. 489. Paris. 1834—37.

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In 1837, Gervais divided the Polyzoa into two subclasses, "Polypiaires hypocrepia," and "Polypiaires infundibulati." The first included the genera with lateral arms, and the second those with round lophophores, among which he placed Fredericella.*

In 1848, Fredericella was restored to its proper division by Dumortier and Van Beneden, but they committed the mistake of uniting it with Paludicella, a genus with a truly orbicular lophophore, and devoid of an epistome.† These authors, also, recognized the Hypocrepian division, as limited by Gervais, separating Fredericella and Paludicella as a distinct group.

Professor Allman in 1856 instituted the order Phylactolæmata, basing it upon the epistome, which is present in all the genera.‡

He divides the order into two suborders; Lophopea and Pedicellinea, the former including all the Hypocrepian forms, and the latter the marine genus Pedicellina. Although differing from Professor Allman in my estimation of the relations of Pedicellina, I have retained his name for the Fresh-water genera, from Fredericella to Cristatella inclusive.

In the Suborder Lophopea, he has two grand groups, or families, founded upon the characteristics of the cœnœcium; one the Cristatellidæ, for the genus Cristatella with its locomotive cœnœcium; and the other the Plumatellidæ, embracing all the remaining genera, that have rooted cœnœcia.

There is a partial coincidence between Professor Allman's classification and the one I advocate. He makes of his Plumatellidæ two groups; one equivalent to my first family including Fredericella, because of the obsolete arms, and another including precisely the same genera as my second family. Thus the classifications virtually agree in regard to the number of the principal groups, although not with regard to their relative values.

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*Gervais. Recherches sur les Polypes d'eau douce. Annales des Sciences Naturelles, 2d Ser. Vol. 7, p. 77.

†Dumortier & Van Beneden. Memoirs de l'Acad. Roy. de Belgique. Vol. 21, p. 5. 1848.

‡Allman. Fresh-water Polyzoa. p. 10.

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According to this view of their relations, the PHYLACTOLÆMATA comprise three families, or subgroups. First; the *Fredericellidæ*, founded upon the great differences between the lophophore and nervous system of Fredericella, and the members of the other families. Second; the *Plumatellidæ*, which differ from the Fredericellidæ in the lophophore and nervous system, and from the Cristatellidæ in their cœnœcial characters. Third; the *Cristatellidæ*, whose cœnœcia and mode of development separate them widely from both the preceding.

The following is a scheme of this classification, enumerating the families and genera by name, and the number of species at present known in America, Europe, India and Australia.

Suborder.	Families.	Genera.	No. of species in America.	" Europe.	" India.	" Australia.	
PHYLACTOLÆMATA.	FREDERICELLIDÆ.	Fredericella.	3	1			
	PLUMATELLIDÆ.	Plumatella.*	5	13		1†	
		Lophopus.	1‡	1			
		Pectinatella.	1		1‖		
	CRISTATELLIDÆ.	Cristatella.	2	1			
			12	16	1	1	30

*Plumatella includes Alcyonella, which is only a variation of the ordinary form of the species.

†A species of Plumatella mentioned, but not named or described, from Melbourne, and the vicinity of Richmond. D. Oyly H. Alpin. Ann. and Mag. Nat. Hist. 3d Ser. Vol. 6, p. 454. 1860.

‡A species mentioned by Dr. Leidy. Proc. Phil. Acad. Nat. Sciences, Vol. 10, p. 190.

‖A statoblast, found near Bombay and described by Mr. J. H. Carter in the Ann. and Mag. of Nat. Hist. Vol. 3, p. 341, pl. 8, f. 8-15, 1859, supposed by him to belong to Lophopus crystallinus. It, however, undoubtedly belongs to a new species of Pectinatella, and I therefore propose for this new species, which is remarkable for its spines, furnished with many lateral hooks, growing only from the ends of the statoblast, the name of *Pectinatella Carteri*.

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FREDERICELLA.

These are plant-like animals with graceful dendritic forms, common in our brooks and ponds (Pl. 7). They cling, immovably fastened by their ectocyst, to the lower surfaces of submerged stones, or floating boards; and thrive best in the darkest places, often carpeting the dismal recesses, under the loosened bark of dead branches, with their lovely, campanulate corollas.

Nothing can exceed the exquisite beauty of these small "phytozoöns"; their symmetrical outlines, the alertness of the motions of the polypides, and the surprising complexity of the internal structure of their transparent bodies richly repay the labors of the microscopist.

Cœnœcium. This part of the colony, formed by the tubular dark brown trunk and branches, is made up of lines of little hollow twigs, or cells, each separate cell encasing a single polypide, and opening into the preceding cell, or parent Polyzoön, at the lower end. Thence the cells are generally attached for some distance to the surface, although frequently the entire branch is free, the lowest cell alone being attached. The extremities of the cells bend upwards, and are always free, but vary exceedingly in length. The color is due to the ectocyst, which is a thin gelatinous excretion, soft, and transparent when first deposited, but acquiring with age a dark brown hue and parchment like consistency (Pl. 7, figs. 4, 5, D). This excretion is the product of the cœnœcial endocyst, or true body wall of the branches and polypides (Pl. 7, figs. 4, 5, 6, E). The endocyst is continuous throughout the general system of branches or cœnœcium, and the latter may, therefore, be regarded as a common tubular cavity, more or less cut up into cells. Some scattered, partial divisions, made by ring-like folds of the endocyst, open in the centre, are found in each colony, but these are not constant, and occur only at rare intervals in the branches.*

Polypide. The free portions of the cells are capped by translucent tubes crowned with thread like tentacles radiating from the periphery of the Lophophore, or floor of the

*Similar to those of Plumatella. Pl. 8, fig. 6.

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crown. This is perforated in the centre by the round mouth, overshadowed by the tongue like Epistome (Pl. 7, fig. 5, I', I''), which is an obtuse, upward fold of the lophophore, opening below into the neural chamber, or cavity. This cavity contains the orbicular nerve-mass suspended immediately under the epistomic opening (Pl. 7, fig. 5, S).

The surface of the tentacles, the oral side of the epistome, the lophophore and the interior of the throat in the vicinity of the mouth are covered by cilia (Pl. 7, figs. 4, H, 5, H''). Constantly vibrating towards the centre of the crown, these cilia create a vortex in the water, at the apex of which lies the mouth, always open and ready to engulph the microscopic plants, or Infusoriæ, that may be caught by the encircling current, and swept into this liquid trap (Pl. 7, fig. 5, I'').

The polypides not unfrequently form a sort of cage, by interlacing the extremities of their tentacles, and imprison the more active of the Infusoriæ, who would otherwise readily escape. Thus inclosed, however, their strength is expended in fruitless efforts to break through the tentacular bars, until finally exhausted and overcome, by the power of the miniature maelstrom, they are whirled unresistingly downward into the funnel shaped throat.

The tentacles are used not only, as above described, to catch the prey, but for a multitude of other offices. They are each capable of independent motion, and may be twisted or turned in any direction; bending inwards, they take up and discard objectionable matter, or push down into the stomach and clear the œsophagus of food too small to be acted upon by the parietal muscles. They are also employed offensively in striking an intrusive neighbor, and their tactile power, sensitive to the slightest unusual vibration in the water, warns the polypide of the approach of danger.

Between the lophophore and the cœnœcium, the internal organization is plainly seen, the pellucid wall of the tube offering no obstacle to the eye of the observer.

The alimentary canal hangs from the lophophore, occupying the centre of the polypide, and floating freely in the rapidly moving blood. The yellowish œsophagus, the stomach barred with brown, and the brownish intestine

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compose a deeply colored axis relieving and vivifying the shadowy outlines of the tube and tentacular crest (Pl. 7, fig. 5, K, K′, K″).

All these delicately proportioned members are balanced upon a fold of the endocyst, called the Invaginated Fold (Pl. 7, fig. 5, B), which is retained within the cœnœcial cell by the Retentor muscles (Pl. 7, fig. 4, 5, N, N′). These together with numerous other sets of small muscles will be described hereafter. At present it is only necessary to call attention to the Sphincter (Pl. 7, fig. 6, L), a broad, contractile band surrounding the invaginated fold, and the large retractors (Pl. 7, fig. 4, fig. 8, M, M′, M″), which are in two sets, one on each side of the alimentary canal. They arise apparently from two common bases, but each large trunk subdivides above into many bundles, which may be distinguished from each other according to the location of their attachments and divided into three branches.

The fibres of the first branch, the Gastric Retractor, are distributed to the stomach; those of the second, the Lophophoric Retractor, to the œsophagus and oral region; those of the third, the Brachial Retractor, to the bases of the arms, and to the endocyst along the line of the Brachial Collar. The crest is swayed by these muscles in every direction; or, when alarmed, the polypide may withdraw by their aid into the larger cœnœcial tube below, very much as the finger of a glove may be inverted within the empty palm. This is so quickly done, at times, as to baffle observation, and the fully expanded polypide, with every tentacle stretched to its full length vanishes instantaneously within the cœnœcium. Often, however, the invagination is more slowly performed, and the motions can then be easily followed.

The polypidal endocyst is first turned inwards, folding upon itself, and prolonging the permanently invaginated fold below. The tentacles, arriving at the edge of the cœnœcial orifice, are pressed into a compact bundle by the action of their own muscles, and, together with the lophophore, are dragged into the cell by the continued invagination of the endocyst until they are wholly inclosed and at rest within the sheath formed for them by the inverted walls of the tube. The sphincter muscle then closes the

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cœnœcial orifice above, and the process of invagination is completed.

The polypide in its exserted state is buoyed up and sustained by the pressure of the fluids within. Consequently when invaginated it displaces an equal bulk of these in the closed cœnœcium, and their reaction, aided by the contraction of the muscular endocyst, is sufficient to evaginate the whole.

The evagination begins with the relaxation of the sphincter, which permits the ends of the tentacles to protrude. These daintily feel about for the cause of the alarm, and, if they fail to detect the proximity of an enemy, the whole fascicle is cautiously pushed out, and the sentient threads suddenly and confidently unfolded.

The polyzoön reasons from the sense of touch inherent in its tentacles, and cannot be induced to expose itself above the cœnœcium until thoroughly satisfied, by these sensitive feelers, that no danger is to be apprehended. In fact, these plantlike creatures, singly mere pouches with a stomach hanging in the midst, exhibit greater nervous activity and "animality," than we find among the more highly organized Ascidia, or shell-covered Brachiopoda.

PLUMATELLA.

The species of this genus abound near the shores of our ponds, close to the surface, and are generally in company with Fredericella (Pl. 8). They may be found attached to the under sides of flat stones, or floating boards, but do not usually seek the narrow, dark recesses in which Fredericella often occurs. Better fitted to endure the sun's rays, they may, occasionally, be seen in positions exposed to their full influence. I have been so fortunate as to collect specimens of P. Arethusa which were growing from the ends of the long water grasses; their tiny branches, and living, crystalline flowers glittering in the light, and swaying to and fro in the open current without protection from the heat, even at midday.

The cœnœcium is dendritic as in Fredericella, but the growth is generally more luxuriant, extending over larger surfaces, and the cœnœcial cells are wider in proportion to

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their length. The polypide, also, is capable of more extended protrusion, and its motions, therefore, are less restrained. The arms, previously indicated in the lophophore of Fredericella, are fully developed, and stretch out on the dorsal side just above the anus, giving a crescentic, or horse-shoe shaped aspect to the disk, which is retained throughout the succeeding genera.

The ectocyst may be either transparent or brown in the same species, and the polypides may be widely separated, as in Fredericella, or be closely aggregated, the branches and cells adhering together by means of their gelatinous ectocysts.

LOPHOPUS.

Lophopus introduces us to a new class of characters. The ectocyst, in place of being a thin enveloping sheet, is a thick deposit of clear jelly in which the cœnœcium is buried. The branches are lobiform, and the cells even less widely separated, or differentiated, than in the aggregated varieties of Plumatella.

Prof. Allman describes Lophopus crystallinus as attached to the stems of Lemna, and other fresh water plants, but avoiding exposure to bright sunlight.

These positions must necessarily, however, be less shaded than those occupied by the majority of the Plumatellæ.

PECTINATELLA.

The reproductive and vital energies of the group reach their climax in the voluptuous beauty and endless multiplication of the cœnœcia in Pectinatella (Pls. 9, 10, 11, 12).

The cells of the separate polypides are wholly merged in the lobiform branches, and the gelatinous ectocyst, often several inches thick, is gathered underneath the cœnœcia (Pl. 9, fig. 5, D). It affords a common base for all the colonies, and is no longer, as in the preceding genera, confined to one cœnœcium.

The tropical aspect and luxuriant growth of the clinging masses, frequently several feet in diameter, investing the summits of submerged stumps, and the branches of

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waterlogged timber, are unequalled among the fresh-water, or even among the marine Saccata of our climate.

The communities, assembled in countless profusion upon the gelatinous ectocyst, are crowded together and being compressed become irregularly hexagonal in their outlines. The polypides upon the lobiform branches, adorn the borders of these hexagonal patterns with a dense, glistening fringe, speckled with the scarlet coloring of their oral regions; and the bare cœnœcial trunk (Pl. 9, figs. 5, 6, 7, A′) in the centre shine with a deep, opaline lustre, completing the rich, coralline effect of the fringed outlines.

The protrusion of the polypides is not limited by the invaginated fold, as in the preceding genera, but they roll out nearly the full length of their evaginable endocyst, and resemble columns supported by a simple ovolo and fillet (Pls. 10, 12). The fillet corresponds to the invaginated fold of the preceding genera, and the ovolo-like bend in the endocyst is produced by the contraction of the anterior retentor muscles.

In July and August specimens of Pectinatella magnifica are very abundant in shallows and in the depths of Pennissewasse pond, but as the fall advances, those in the shallows die, and in October they can live only upon the logs in deep, cool water, or in shaded situations. These autumnal specimens are old, and being unable to withstand the direct rays of the sun, disappear from all exposed positions, where they grow with impunity as strong and healthy adults earlier in the season. I have found them fifteen or twenty feet below the surface, showing a marked departure in this respect from the preceding genera, whose species seldom occur below two, or three feet, and are almost invariably near the shore line.

CRISTATELLA.

The Cristatellæ are by far the most highly organized, not only of the Phylactolæmata but of all the Polyzoa (Pls. 13, 14).

The cœnœcia are neither dendritic, as in Fredericella and the Plumatellæ, or lobate, as in Lophopus and Pectinatella, but naked, depressed sacks, capable of determi-

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nate motion; their interior divided by walls of reticulating muscular fibres into numerous radiating cells and tubes. The latter, however, do not meet internally, but leave a vacant space in the centre of the cœnœcial trunk unoccupied either by the polypides, or the muscular walls (Pl. 13, figs. 2, 3, A').

The polypides extend to the full length of their evaginable endocyst, and are destitute of an invaginated fold, not even possessing a fillet around the upper edge of the cœnœcial orifice as in Pectinatella (Pl. 14, fig. 1). They are disposed in rows upon the borders, inclosing the clear, bare central spaces with an edging not unlike the polypidal fringes of Pectinatella (Pl. 13, fig. 1).

The ectocyst loses the fixed character it still possessed in Pectinatella, and is only a transient, gelatinous excretion, thrown off in great abundance from the common base of the colony (Pl. 13, fig. 3, D).

The communities are not invariably gathered upon a common ectocyst, as in Pectinatella, but are sometimes single, as in Lophopus.

There is, however, a very curious, and remarkable similarity of one species with Pectinatella.

The cœnœcia of C. ophidioidea herd together within confined boundaries from a few inches to a foot or more in diameter, covering such favorite resorts with a glairy coating accumulated upon the surface by the moving bases of the numerous colonies. The aspect of one of these settlements, supported upon this common ectocyst, is analogous to that of a mass of Pectinatellæ; especially to the old age, or degradational period of the life of a mass of the latter; where a large number of colonies still cling to a thin sheet of gelatine left from the decay of the greater part of the ectocyst.

This similarity may be explained by the fissiparous multiplication of the cœnœcia in both genera and the slow progression of Cristatella. The colonies of the last can never wander far from their place of origin, unless floated off by some accident, and, continually multiplying, they soon create a dense population in a comparatively small space.

The distribution of Cristatella is similar to that of Pectinatella, they being generally found together.

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Reproduction.

The Phylactolæmata have two modes of reproduction, one by buds, and the other by eggs. The former occurs in two ways; by statoblasts, either fixed or free, and by regular buds, which grow out from the side of each polypide. The first are the founders of new colonies. The last merely increase the number of individuals in each established community. The colonies are, however, sometimes multiplied by other processes, which cannot be classified under either of the above heads. In large specimens of Plumatella Arethusa the polypides on the old trunk die first and the remnants of the cœnœcia are gradually swept away, leaving the branches as so many independent colonies (Pl. 8, fig. 1). This, also, is not uncommon with Plumatella diffusa, and is, probably, peculiar to all the species of this genus that distribute their branches over a large surface.

I have directed, perhaps, more attention to the old age than to any other period of the growth of the individual, and among the many curious and novel facts, which this comparatively untravelled path of investigation has led me to, there are few more interesting than the above.

Specimens of Fredericella may be often observed attached near the ends of their branches by the soft ectocysts of their younger polypides, the ragged end of the branch floating freely above. These may sometimes have been torn by accident from the parent colony, but in the majority of cases they owe their liberation to the decay of the original stock. In Pectinatella and Cristatella the march of extinction is, also, from within outwards. But, in consequence of the greater width and the common occupation of the cœnœcium by the polypides, the decay of those in the interior does not effect the vitality of the trunk, and their living cœnœcia carry both the quick and the dead (Pl. 9, fig. 11).

Thus death, which is an active agent in multiplying the number of independant colonies in Fredericella and Plumatella, is, probably in Lophopus, and certainly in Pectinatella and Cristatella, of no avail; the constrictive power of the endocyst being its functional substitute in the

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three last named genera. Although the polypides of the Phylactolæmata never display any marks of fissiparity, the cœnœcia are multiplied by division. I have seen the lobiform branches of old colonies of Pectinatella divided from the cœnœcial trunk by constrictions, which, gradually deepening, finally separated them from the latter. The form, the thickness of the ectocyst, and the vast number of cœnœcia upon every mass, indicate, that this selfmultiplicative mode of propagation is of frequent occurrence among the adults.

Prof. Allman has observed similar phenomena in Cristatella and Lophopus, showing it to be common to all the genera having the thickened gelatinous ectocyst. It appears probable, that this method of multiplying the colonies would also take place in Fredericella and the Plumatellæ, if it were not for the toughness of the ectocyst. The partial divisions continually occuring in the branches of these genera and, apparently, restrained only by the stiffness of the ectocyst from becoming effective and severing the cœnœcia, wherever they occur, into separate parts, are the homologues of the permanent septa between the cells of Paludicella and of the lateral partitions in the marine Polyzoa. This homology was suggested to me in observing the readiness with which the lobes of Pectinatella were cut off; the constrictions occuring irregularly, sometimes isolating a whole branch, sometimes only a few cells. If the ectocyst was pergameneous in this genus the constrictions would either not take place at all, or form scattered partitions, as in Fredericella and Plumatella. Thus the same function that produces a constant anatomical character in Paludicella, Fredericella, and Plumatella, would seem to be the effective cause of the selfmultiplication of the cœnœcia in Lophopus, Pectinatella and Cristatella.

Prof. Allman divides the mode of reproduction by buds into two, "non sexual reproduction by gemmæ, which at once proceed to the full term of their destined development," and "by statoblasts or gemmæ in which the developmental activity remains for a period latent."*

The statoblasts bud from the funiculus, a cord like pro-

*Fresh-water Polyzoa. p. 41.

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longation of the outer membranes of the stomach, connecting the lower end of that organ with the bottom of the cell in the vicinity of the bases of the retractors.

The researches of Mr. Hancock, upon the early development of the statoblast, which he supposed, in common with other observers of that time, to be a true ovum, and those of Prof. Allman, give an almost complete history of their growth.* The former found them in Plumatella and Fredericella, in the interior of the funiculus, as large nucleated cells; and the latter, apparently begining his investigation at a later period, as a mass of smaller cells, which must have resulted from the division of the primary cell of Mr. Hancock.

They arise within bead like swellings of the funiculus, and, enlarging slowly, push out to the surface of the chord, and upwards towards the stomach, until finally they hang upon the exterior, arranged alternately on either side, the youngest being at the lower end (Pl. 8, fig. 2, W).

According to Prof. Allman the contents increase in bulk by the formation of new cells, and are enveloped in a cellular membrane (Fig. 1, a) with an outer gelatinous envelope (Pl. 8, fig. 2, W''''). Between these, two other membranes are secreted, one of which constitutes the horny sheath, and the other the annular ring of the statoblast (Pl. 8, figs. 7, 8, 9, W', W''). This sheath and the annulus gradually assume a distinct cellular structure, and a horny consistency; the former at the same time acquiring a deep brown color, and the latter a brilliant golden hue.

The contents of the statoblast are often contracted, and, while in this condition, during the earlier stages of development before the horny casing becomes too opaque, the membranes may be analyzed by the aid of the microscope.

The interior cells are large and colorless. They are surrounded by a thin, homogeneous membrane, which, when the cellular contents are reduced by contraction, seems to be drawn out into numerous, minute, conical projections at the points where it is attached externally to the overlying membrane (Fig. 1, b). I was unable on account

*Albany Hancock. Ann. Nat. Hist. Vol. 5. p. 190.

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of the opacity of the sheaths of the specimens of Fredericella regina, upon which my investigations were principally made, to determine with absolute precision, whether these conical projections were tubes, or partly solid muscular bands connecting the investing membrane with the overlying layer (Fig 1, a).

The cellular contents do not project into the interior of the cones, as they might be expected to do, if the latter were simply hollow continuations of the investing membrane. This fact may be considered as favoring the opinion, that they are partly solid, and, perhaps, muscular, connective bands, or else there must be another membrane interior to the one described, which, also, invests the cellular contents and prevents the cells from flowing into and filling up the conical projections. The overlying layer (Fig. 1, a) is exceedingly thick, and acts, in all respects, like a muscular membrane. It is unconnected with the horny sheath, and either lies closely against the latter, or is separated from it; and may be smooth and of equal thickness throughout, or corrugated and of unequal thickness, as in fig. 1, according to its state of expansion, or contraction.

The horny sheath is composed of flattened, hexagonal cells, the whole surface garnished internally with a thin coating of short, horny, brown colored setæ (Fig. 1, W'). This sheath is so exceedingly tough and hard that it is difficult to pierce it with the point of a needle.

The annuli of the statoblasts of Plumatella, and of the other genera in which they are found, are made up of more prominent and larger hexagonal cells than those of the horny sheath.

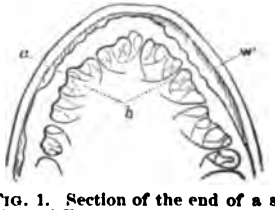

FIG. 1. Section of the end of a statoblast of FREDERICELLA REGINA; *b*, conical projections on the surface of the cellular contents; *a*, thick, muscular membrane; *w'*, horny sheath.

In Fredericella the annulus is not developed, but in all the other genera it is, and in Pectinatella and Cristatella spines are superadded.

These spines apparently arise from the annulus in Pectinatella, as described by Dr. Leidy, but they may be traced by a close

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examination of this part, by transmitted light, to their junction with the body of the statoblast. From the edges of the statoblast they pass through the centre of the annulus, coming out on the border of the seam, that divides the upper and lower sides of the annulus.

Prof. Allman describes the statoblasts of Cristatella as surrounded by a ciliated envelope before the spines begin to be developed, and remarks, that these impinge upon this membranous envelope, which gives way before them and disappears. I have been unable to detect any similar ciliated membrane in Plumatella or Pectinatella, and, in this respect, Cristatella probably differs from all the other Phylactolæmata. The gelatinous matrix of the statoblast of Pectinatella does not reach its full growth before the spines are produced, but appears to be carried up on their sides as they progress outwards. When the spines are fully developed, the reentrant spaces in the envelope between them become filled out, and they are buried in the gelatine, like those of Cristatella when they first begin to protrude from the horny sheath.

The gelatine is absent from the full grown statoblasts of Fredericella and Plumatella, which are found naked in the cœnœcial cells, whereas those of Pectinatella and Cristatella are enveloped by it until after the death of the colony; losing it only by decay. In the two first this covering is not essential, and it is absorbed before the bud is floated out of the cœnœcium, while in the two last it is needed in order to protect the parent from laceration by the pointed hooklets of the spines, and it is, therefore, retained until lost by the exposure of the bud to external influences.

Before the spines of Pectinatella appear, and often, even before the horny casing shows the deeper shades of the brownish coloring that afterwards distinguishes it, the statoblasts are detached from the funiculus. They lie loose in the cœnœcial cavity from this time until the death and decay of the polypides destroy the upper parts of the cells. Through the openings thus made, being lighter than water, they are readily floated off and pass the winter unprotected by any other covering than their cellular casings, although remaining near the surface, and consequently, in the higher latitudes, imbedded in the ice for several months.

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Growth begins at the approach of spring and the edges of the sheath are split apart by the increasing bulk of the polyzoön, which protrudes between them. The opacity of the sheath has hitherto prevented microscopists from ascertaining the early history of the development of the polypide, and we are obliged to be content with such observations as can be made during the later periods of its life, when it is partly exposed.

The organs, when the little animal first makes itself visible, are well advanced in growth and the polypide is already capable of retraction and expansion. For a time it floats freely in the water, wafted about by the cilia, which clothe the whole external surface, and increases in size until the sheaths of the statoblast can no longer contain it; then, in some appropriate locality, the gelatinous ectocyst adheres to the surface, the cilia are absorbed, and the polypide enters upon a new phase of life as the founder of a community.

The sides of the sheath and the annulus, although separated from each other, frequently cling to the bud, and may occasionally be found adhering to its sides even after the colony has attained its full size.

Besides these floating buds, which might be called free statoblasts, there are others, originating in a similar manner, but from the attached or lowermost sides of the cells instead of the funiculus. These remain permanently fixed by their external investment to the endocyst, and, on this account, I have called them fixed statoblasts. They have been described in Plumatella emarginata and Alcyonella (Plumatella) Benedeni by Prof. Allman, and by Dr. Leidy in Plumatella nitida.*

It may be well to remark here, that the location of the free statoblast in Fredericella is different from what it is in all other genera. After dropping in the usual manner from the funiculus they become soldered to the sides of the parent cells, and being of the same size, are indistinguishable from the true, fixed statoblasts.

The fixed statoblasts found in Plumatella are much

*Dr. LEIDY. Proc. Philadelphia Acad. Nat. Sciences, Vol. 5, p. 321.

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larger than the free forms, have no annulus, and in many species the walls of the cells immediately under them become so compact and hard, that they cannot be removed from the surface of the wood or stone to which the cell is attached without considerable exertion.

Certain so called exceptional forms of buds, also, previously noticed by Prof. Allman in Alcyonella fungosa and Lophopus crystallinus, are very abundant in Cristatella, on the interior of the basal membrane* (Pl. 13, figs. 2, 3, 8, 9, 10, 11, 12, X). They are at first small oval bodies near the border, jutting out from the endocyst of the tubes leading to the second or third line of polypides. Their composition is similar to that of the statoblast. They have a thick external membrane and granular contents, but are devoid of a gelatinous envelope, and, also, have a large vacant spot in the interior which is continually varying its shape and position. Simultaneously with them, and continuous with their outer envelope, a long ridge springs up from the endocyst and the outer membrane of the bud, which, becoming membranous, splitting into two portions, and connecting with the upper side of the cœnœcium, eventually incloses them in a tube (Pl. 13, figs. 8, 10, 11, Q). This ridge sometimes passes directly over the centre of the bud, and sometimes to one side, but is almost always present. It occasionally retains the cord like embryonic character, and freeing itself from the endocyst, except at the extremities, forms a pseudo-funiculus, suspending the bud in the cœnœcial cavity. The thick external membrane becomes in course of time differentiated from the walls or ridges, and acquires the horny consistency of the casing on the free statoblast, but is never so opaque, or deeply colored. As the outer membrane stiffens no change seems to be made in the granular contents, but the more convex face of the envelope sinks, forming an elliptical depression, and the greater number of the buds become free (Pl. 13, fig. 12, W'). Prof. Allman found them to be hollow, and described this elliptical depression as an aperture. I was, however, unable to substantiate either of these con-

*ALLMAN. Op. cit. p. 40.

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clusions in Cristatella. The rupture of the sheath and the consequent escape of its contents is not an uncommon occurrence among the fixed statoblasts of Plumatella; and this seems to have been the cause of the emptiness of the specimens described by Prof. Allman. From their mode of development, and the place they occupy in the cœnœcium, it is probable that they are the same as the fixed statoblasts of Plumatella. They differ, however, from the fixed statoblasts in being unattached to the endocyst when fully grown, but this not being an invariable character, and the elliptical depression, which is nothing more than the accidental sinking in of one side of the sheath, being quite common, even among the free statoblasts of Plumatella, I see no reason for considering them exceptional forms.

At an early stage of growth, while still floating freely in its native element, the statoblastic polypide begins to multiply by the process of budding. An internal swelling of the endocyst, on the lower side, in the vicinity of the bases of the anterior retentor muscles, first shows the position of the coming polypide. This elongates into a little hollow sack with a thickened rim (Pl. 7, fig. 5, Y), upon the upper edge of which, in the Hypocrepian Polyzoa, a slight notch is formed by the duplication and pushing out of its sides into two loops joined along the centre (Pl. 13, fig. 4, Y). A series of minute folds of the membrane on the upper sides of the loops are the incipient tentacles, and, as they enlarge, the intervening membrane is drawn up with them like a thick web; but this, however, eventually recedes externally and becomes the calyx. The loops growing outward augment their longitudinal diameter at the expense of the transverse, and the inner sides of each, approximating and at last coalescing, make up the lophophore and arms. Preceding the beginning of the tentacles, a transverse constriction of the body of the little sack draws the line between the œsophagus, and the stomach; and the subsequent deepening of this constriction divides off the internal cavity, establishing the cardiac and pyloric valves. The muscles, which become well differentiated at a very early period, are divisible into three pairs: one pair attached to the rim, the Brachial Retractors; one to the region

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of the œsophagus, the Œsophagal Retractors; and one to the region of the stomach, the Gastric Retractors. They are active from the first, and appear to drag the polypide inwards, stretching the endocyst of the parent, which is joined to the loops, into a tube. This tube is the future evaginable endocyst of the polypide; and, as the various organs are developing, it is everted little by little, becoming gradually capable of the adult evagination.

The tentacles of Cristatella ophidioidea are not fully grown, nor the arms divaricated, until long after the evagination of the polypide is completed (Pl. 13, fig. 3, Y'). At this period the tentacles of the external rows near the mouth are the longest, decreasing regularly to the mere tubercles on the ends of the arms, and the internal tentacles are not separated from each other, exhibiting only two closely appressed lines of tubercles all of about equal length. The division of the arms begins internally, and its progress outwards may be followed by the gradually increasing length of these interior rows, which retain their tubercular character until this division commences (Pl. 9, fig. 14).

The mode of reproduction by true ova, although detected by Dumortier and Van Beneden, was first fully described by Prof. Allman. They are produced from the gemma dot, a bud-like mass on the upper side of the endocyst in the neighborhood of the orifice, which, during the fall, when not filled with ova, becomes opaque and granular.*

The testicle, first described by Dumortier and Van Beneden, arises from the funiculus, resembling in its mode of formation, according to Prof. Allman, a true bud. The

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*Prof. Allman thus describes the earlier periods of the development of the ovum. Monograph Fresh-water Polyzoa p. 33.

"*Development of the Ovum.*—I have succeded in tracing the development of the ovum through most of its stages in Alcyonella fungosa.

In this polyzoön the mature ovum consists of a granular vitellus, surrounded by a very evident vitellary membrane, on whose internal surface the contents appear frequently to be aggregated in a coarse granular layer. It presents a large germinal vesicle, and a very distinct germinal spot. After a time the germinal vesicle and the germinal spot disappear, and the vitellus undergoes segmentation, and after the mulberry-like condition thus induced has in its turn vanished, we find the contents of the egg have assumed the form of a roundish or oval body, richly ciliated on its surface, and provided with a large cen-

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nuclei of the cells are of large size and in due time are converted into spermatozoa. These have been observed swimming freely in the perigastric cavity into which the full grown ova are, also, discharged from the ovary.

After the segmentation of the vitellus, the egg appears as a hollow oval body clothed externally with cilia, and it is at this period that most observers have seen and described its peculiarities.

Mr. Albany Hancock, although confounding it with a statoblast which he supposed to be an egg, speaks of one, an undoubted ovum, which, he observed forcing its way through the closed orifice of the cell, rending and destroying the parent polypide in its course.*

I have, also, seen them during this stage in Plumatella

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tral cavity, which as yet does not open externally. When liberated from the outer membrane of the ovum, which still confines it, it swims actively through the surrounding water by the aid of the cilia with which it is invested.

As development proceeds, we find the ciliated embryo while still confined within the coverings of the egg, presenting in some part of its surface an opening, which leads into the central cavity; and through this opening an unciliated, hernia-like sac is capable of being protruded by a process of evagination. The unciliated protrusible portion would seem to have been derived by a separation from the walls of the central cavity, and appears therefore to originate by a process of unlining, a true chorization.

Towards the opening, which leads from without into the central cavity, the chorization is incomplete, the membrane as it separates being here still held to the walls of the cavity by irregular transverse bands; these bands check the entire evagination of the membrane, but after a time they disappear, and then the unlining and evagination are perfect. In the interior of the protrusible portion, and before the disappearance of the transverse bands, a polypide is developed." The further development of this polypide, as described by Prof. Allman, does not differ materially from those produced from the regular buds of the adult cells.

The same authority thus describes the testicle of Alcyonella (Plumatella) fungosa on page 82 of the work above quoted.

"The testicle is composed of a mass of spherical cells, each of which contains within it numerous secondary cells, "vesicles of evolution." The visible contents of the vesicles of evolution consist, at first, of nothing more than a well-defined spherical nucleus, and this is subsequently transformed into a spermatozoal filament, which finally escapes by the rupture of the containing cells. The spermatozoal filaments, in this genus, are simple vibrioid bodies without any terminal enlargement."

*Hancock. Op. cit. p. 186, note.

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Arethusa, squirming in the perigastric cavity, and tossing the stomach of the polypide about, as if it had been a plaything. They certainly, in this species, evinced sufficient power to open a passage through the thin membrane of the polypide, although such did not seem to be their object at the time.

No orifices for the expulsion of the ova have been as yet positively demonstrated. Meyen chronicles the escape of the eggs of Alcyonella (Plumatella) stagnorum from an opening in the vicinity of the anus.* But this is, probably, erroneous, since, as observed by Mr. Hancock, "the great size of the egg forbids the possibility of its escape without the destruction of the polypide."

From the preceding account it may be seen that there are four localities, all within the cœnœcium, devoted to the function of reproduction. These are, the ovary on the dorsal side of the orifice; the free part of the endocyst of the cell on the abdominal side, bringing forth true buds; the attached portion lower down, giving birth only to fixed statoblasts; and the funiculus, generating spermatozoa and free statoblasts. The true buds of Fredericella and Plumatella are numerous, although only one usually matures and prolongs the stem: when two or three mature, at the same time, the lateral branches are produced. These buds grow slowly, forming the ordinary tubular cells. In some varieties of Plumatella, however, the buds mature more rapidly and in greater numbers, while the branch assumes a lobe-like form, the polypides, with the cells but half developed, crowding the upper surface. This mode of formation, which is only a variation of the species in Plumatella, is of generic value in Pectinatella, where the polypides are invariably arranged upon lobiform branches. In Cristatella the true buds are more numerous than in any other genus, and they mature until the cœnœcium is full grown.

The gradual increase in the number of the buds, that reach *maturity*, coincides with the decrease in the toughness of the ectocyst, and its final obliteration in the higher

*Meyen. Isis. 1828, p. 1228.

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genera; and the absolute number of the buds to the expansion of the bud producing surface. As has been shown in the preceding paragraph, the number of the buds reaching maturity, and their absolute number in each cell of Fredericella, is generally less than in those varieties of Plumatella that have a gelatinous ectocyst; and they are less, in the latter, than in the Pectinatellæ, which have no ectocyst; and less in the Pectinatellæ than in Cristatella, where the ectocyst is wanting, and where the bud producing surface is of the greatest extent.

Composition of the Endocyst.

In the foregoing remarks the anatomy has been discussed, so far as was necessary, in order to give clearness to the descriptions of the different genera and the subsequent notice of the modes of reproduction. It now remains to consider more fully the composition of the body, together with the relations and functions of the various organs.

The endocyst is made up of four layers: (1) an outer large celled membrane (Pl. 11, fig. 1, E′, Pl. 12, fig. 2, E′, Pl. 13, fig. 16); (2) an inner one of smaller cells (Pl. 11, fig. 1, E″); (3) one of muscular fibre (Pl. 11, fig. 1, E‴); (4) an epithelial layer lined internally with muscular fibre (Pl. 11, fig. 1, E⁗).

(1) The first membrane forms the external surface of the endocyst of the polypide and of the cœnœcium.

The cells on the cœnœcia of Fredericella and Plumatella are hexagonal containing a large brilliant nucleus and nucleolus (Figs. 3, 5). Their upper sides are depressed by the weight of the superincumbent ectocyst, and their longitudinal diameters are not so long as in the cells of the same membrane on the evaginable endocyst.

When fully expanded on the living cœnœcium the cells are closely pressed one against another; but, if treated with alcohol, they contract, and, separating from each other, leave wide intervening spaces (Fgs. 2, 4, 5). These spaces have been figured by Prof. Allman under the impression that they were anastomosing channels, perhaps blood channels; my observations, however, have been too numerous to leave any

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doubt of their being what I have stated. The larger cells are continually multiplying by division, and there result numbers of small cells which lie scattered here and there in the supposed blood channels. Fig. 3 shows a large cell undergoing the process of division, and below, near the right lower corner of the figure, there are two minute cells, undoubtedly created in a similar manner, occupying the interstices of the membrane. Fig. 5 shows a group of cells taken from a point nearer the orifice than those of fig. 2, and, also, from a different zoöid. These are not so disfigured by contraction and have more angular outlines. Fig. 4 shows a group of five cells, from another zoöid, more highly magnified than either of the above, and more widely separated. When the cells are so dispersed the intervals are usually more or less filled in by minute cells; but, in this instance, the spaces were vacant and the nucleus of immense size, the nucleolus not being visible.

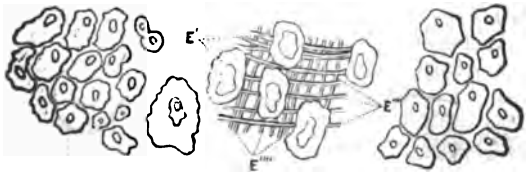

FIG. 2. FIG. 3. FIG. 4. FIG. 5.

FIGS. 2 and 5, groups of cells of the first membrane, greatly enlarged, from the cœnœcium of PLUMATELLA VITREA.

FIG. 3, one cell still more enlarged showing nucleus and nucleolus.

FIG. 4, E', cells of first membrane: E''', muscular fibres of the third layer: E''', muscular fibres of the fourth layer.

The cells on the cœnœcia of Pectinatella and Cristatella do not differ sensibly in their structure from those of Fredericella and Plumatella. The outer sides, however, being free from the presure of an ectocyst, are more convex; and the longitudinal diameters, instead of being less, are greater than in the cells of the same membrane in the evaginable endocyst. Plate 13, fig. 16, and figures 7, 8, E′ present lateral views of the membrane in the cœnœcia of Cristatella and Plumatella: in figure 8 the cellular structure is not given, but the relative thickness of the membranes may be estimated by a comparison of the two figures. The cells of the first membrane of the evaginable endocyst do not vary

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essentially from those on the cœnœcium, except in being greater or less than the latter, as mentioned above, and in having the power of expanding and contracting their parietes. They may swell to twice or three times the normal size, and contract again with considerable quickness, as if they had collapsed after parting with their fluid contents. From the evaginable endocyst they can be followed into the calyx, which, in the adult, is merely a web like fold of the first membranous layer; and from the calyx into the external ciliated membrane of the tentacles.

The cells on the calyx and tentacles are of about the same size as those on the evaginable endocyst, but they are not so distinctly hexagonal, unless contracted. The outer sides are more convex, than those on the cœnœcium; this peculiarity is, also, shared by the cells of the evaginable endocyst. The nucleus is large and brilliant. The nucleolus was not defined. The cilia are prolongations of the walls of the cells; each cell bearing one long slender hair (Fig. 6).

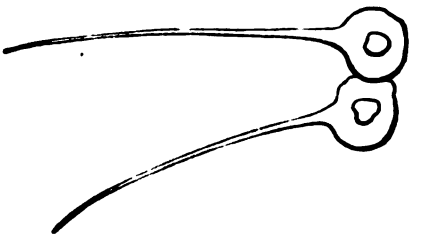

FIG. 6, two living cells, with cilia, from near the tip of a tentacle of FREDERICELLA REGINA.

The vibrations of the cilia are not constant, and, if a tentacle be severed and quickly placed under the microscope, those that are at rest can be viewed without difficulty throughout their entire length.

The cells become smaller on the lophophore, forming a denser layer than on the other parts of the zoöid. There is no break upon the edge of the œsophagus and the cells of the first membrane are continuous with the cells of the innermost layer of the alimentary canal.

(2) The second layer is made up of smaller cells. It is

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coextensive with the first, and is the principal membrane of the endocyst. The size of its cells does not vary appreciably within the limits of the group. As a general rule, however, its thickness in the cœnœcium is quite double what it is in the evaginable endocyst, and on the outer side of the tentacles. On the inner side of those organs, and in the lophophore, it becomes as thick as it was in the cœnœcium. In the arms, also, it is thicker than in the evaginable endocyst; but its greatest development in this respect is attained in the region of the sphincter muscles (Fig. 8, E″). This membrane is thicker than the first membrane in the other parts of the cœnœcia of Fredericella and Plumatella, but thinner than the first membrane in the cœnœcia of Pectinatella and Cristatella (Figs. 7, 8, E″).

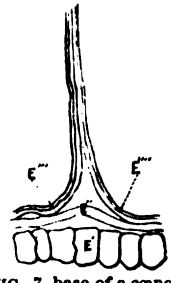

FIG. 7, base of a cœnœcial wall of a living specimen of CRISTATELLA OPHIDIOIDEA viewed from the base, the specimen being inverted: E', first membrane of the endocyst: E", second membrane of the endocyst: E‴, third layer of transverse muscular fibre: E⁗, epithelial membrane with longitudinal muscular fibres.

(3) The third layer is exceedingly contractile. The transverse fibres of which it is composed are loosely and irregularly set, but have considerable muscular power (Figs. 4, 8, E‴). The cœnœcial endocyst of Plumatella is sometimes drawn in by annular constrictions, happening, apparently at will, in any part of the wall where the ectocyst is sufficiently pliable, which are generally referable to the action of this muscular coat. Such annular constrictions can be occasionally traced to rows of small muscles extending across the cavity from the endocyst to the alimentary canal, or to the invaginated fold. These muscles, however, could not have been the cause of the constrictions in the dead Plumatella Arethusa figured in Pl. 8, fig. 10. The most careful observations of this specimen, with a high power, failed in bringing to light any such rows of muscles, and, in this case, all the plications, with the exception of those brought about by the influence of the retentor muscles (Pl. 8, fig. 5), were due to the transverse annular muscles of the third layer.

An involution of this layer aids in forming the base of

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the walls in the cœnœcium of Cristatella (Fig. 7, E‴), but it does not probably extend into their reticulated portion (Pl. 14, fig. 1, Q). Judging from the thinness of the latter, and, from the fact, that all the longitudinal muscles of the body appear to be connected more or less with the fourth or epithelial membrane, it is quite likely that the reticulated portion, or those parts of the cœnœcial walls which lie between the junctions of the walls with the upper and lower internal surfaces of the cœnœcial endocyst, are composed wholly of longitudinal fibres, encased by the epithelium. Around the invaginated fold of Plumatella the fibres are thickly disposed and form the so called sphincter muscle. This is not a narrow band, as described by Prof. Allman, encircling the lower edge of the fold, but a local development of the transverse fibres, as broad as the fold itself (Fig. 8, E‴).

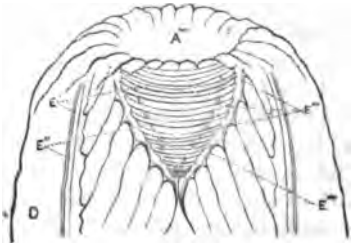

FIG. 8, Magnified view of the Invaginated fold of a living specimen of PLUMATELLA DIFFUSA.* A'''', cœnœcial orifice: D, ectocyst: E', first membrane of the endocyst: E'', second membrane of the endocyst: E''', third layer of transverse muscular fibre, constituting the Sphincter muscle. E'''', fourth or epithelial layer, accompanied by longitudinal muscular fibres.

In the evaginable endocyst this layer can be seen, by careful focussing, through the fourth membrane, but only with ease, when more or less contracted.

In the arms and lophophore it is thick, and frequently, in the former, becomes convoluted by the action of muscular bands apparently developed in its substance. I was unable to trace this membrane in the tentacles, but judging from the great thickness of the second tentacular membrane, and the slight increase which takes place in the transverse diameter of those organs when

*NOTE. Only three membranes are delineated in the cœnœcial endocyst of figure 8. This is owing to my want of success in defining the parts of the innermost layer, in the specimen figured, which is undoubtedly made up of two layers, as in the cœnœcium of Cristatella (Fig. 7, E'''. E'''').

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drawn in, as they often are, to less than one third of their full length, I have ventured to assume that it also exists there (Pl. 11, fig. 1, E'''').

(4) The fourth or epithelial membrane, lines the interior, investing all the muscles and the digestive system. It is ciliated upon the perigastric region, and upon the interior of the arms and lophophore, but not in the tentacles or upon the alimentary canal. On the abdominal side, a double layer, or fold, of this membrane, which I have named the Brachial Collar, constitutes a partial diaphragm reaching about half way round the œsophagus. On the dorsal side it is disconnected from the lophophore, and hangs into the perigastric space, partitioning off the inside of the epistome, and a space below in which the ganglion is suspended. There are numerous fibres upon the inner side of this diaphragm attached to the œsophagus and endocyst, between the bases of the arms, having sufficient contractile power to deeply infold that part of the body wall.

Prof. Allman mentions but two membranes in the endocyst, one, an outer large celled layer, equivalent to my first and second membranes, and another, an inner layer, equivalent to my third and fourth membranes. Throughout its whole extent, the fourth or epithelial layer is lined by muscular fibres. These cross the transverse fibres of the third layer at right angles (fig. 4, E''''). and both were regarded by Prof. Allman as a single inner layer of reticulated muscles. The longitudinal fibres, however, are invariably next to the fourth membrane, and remain attached to it, whenever, as in the neural diaphragm, it parts from the other layers. The transverse fibres, also, never seem to be connected with the longitudinal, wherever a good definition of either has been obtained. No transverse fibres are visible on the neural diaphragm; and on the invaginated fold (Fig. 8), and the œsophagus (Pl. 11), no longitudinal fibres are visible.* In the two latter they are

*NOTE. Since the printing of the plates, I have, in reviewing these pages, changed my opinion and now estimate the longitudinal fibres, as of equal importance with the transverse, and consider them a fourth layer of muscular fibre, the epithelial becoming a fifth membranous lay-

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undoubtedly present, being occasionally seen in a direct view; but, when looked for in a lateral section, they are too diaphanous and closely adherent to the fourth membrane to be defined. Their incorporation with this membrane will also be justified by the description of its functions in connection with the alimentary canal of Pectinatella.

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er. The endocyst is consequently made up of three membranous and two muscular layers; all the specialized constricting muscles of the body being derived from the third layer, and all the longitudinal from the fourth layer of muscular fibre.

The inner and outer tentacular bands, as will be presently shown, are inseparable from the latter layer. The retractors, also, notwithstanding their disc like structure, can hardly be distinguished from the numerous abnormal bands, that occur in some species, connecting the endocyst and alimentary canal. These undoubtedly belong to the fourth layer, and the retractors may, therefore, be looked upon as having the same relation to the fourth layer that the sphincter has to the third.

The peculiar arrangement of the third and fourth layers retains the form of the parts, and gives stability to the entire endocyst. By the contraction of the third and relaxation of the fourth the transverse diameters of the parts may be decreased, and the longitudinal increased; or, by the opposite process, the longitudinal may be decreased, and the transverse increased. During the invagination of the polypide, the fibres of both are in a state of contraction in the evaginable endocyst and in the region of the sphincter; in the cœnœcium, however, they are relaxed. But as soon as evagination begins, they appear to reverse this condition. The cœnœcial fibres become contracted and those of the same layers in the polypide are stretched to their full length. By these reciprocal changes they materially assist the compressed fluids of the body in forcing out and expanding the polypide. I have, also, had reason to doubt the existence of a neural diaphragm. In examining a specimen of Fredericella regina from the side and from above, under very favorable circumstances, I was unable to detect the same appearance of an enveloping membrane just below the nerve mass, that led me to the conclusion mentioned; nor have I had any opportunity of verifying my first observations on Pectinatella, which, however, were faithfully made with one of Tolle's one half inch objectives. Until therefore, Fredericella is shown to be exceptional in this respect by further observations on other genera, it is, perhaps, best to regard the existence of a neural diaphragm as doubtful.

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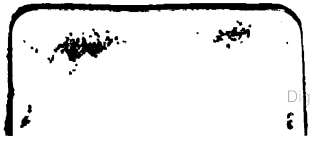
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